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Trade and industrial education staff development practices in the community and technical colleges in the Midwest

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TRADE AND INDUSTRIAL EDUCATION STAFF DEVELOPMENT PRACTICES IN THE COMMUNITY AND TECHNICAL COLLEGES IN THE MIDWEST

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Trade and industrial education staff development practices in the community and technical colleges in the Midwest

by

Ben U. Nwoke

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DEDICATION

This dissertation is dedicated to my late loving father, Mr. Uduma Nwoke Amogu, who as a Headmaster, promoted staff development training in the Nigerian elementary schools which he administered.

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CHAPTER I. INTRODUCTION

In an era of increasing emphasis on professionalism, every phase of the educational enterprise contains staff development implications, and should be considered as an integral feature of the longitudinal education program. Staff development programs directed toward the improvement of instruction have the potential for exerting a significant impact on the entire system of education. Bishop (1976) maintained that staff development should be woven into the ongoing substantive, procedural and organizational fabric of the educational system. His action guideline statement stresses that staff development and program improvement activities are keys to positive action in education and are critical means for responding to the changing political and economic situation, as well as to the needs of the educational enterprise.

Supporting this view of staff development, Strong and Schaefer (1976) stated that, "A deep concern for the quality and development of staff is the key to the success of any quality program" (p. 167). Wolansky (1981) also maintained that an investment in inservice program for faculty is an investment in human resources development. The multiplier effect of teachers serving a large number of students in community and technical colleges increases the benefits of staff development.

As we move toward the twenty-first century, Bloom (1976) argued that the changing technology and the resulting changes in society have made old notions of adapt to the system or drop out unacceptable to a healthy society. The community and technical colleges exemplify society's commitment toward offering a diverse population of students alternatives

in educational and work experiences. To fit this new philosophy of education, Bloom suggested that the contemporary teacher is expected to be competent in his/her discipline and provide a sound education. The purpose of Industrial Vocational Education (Trade and Industrial Education) program is to prepare students adequately for successful entrance into and advancement within industry. The prime requisite for a successful program is a qualified instructor who is occupationally competent and also competent in teaching methods and supporting skills which are essential to the success of instructional process.

Given the complexity of a rapidly changing society with marked regional and local variations with all that this implies for the schools, Davies (1976) noted that the shift in emphasis has been away from inservice training to inservice education. He argued that traditional inservice training has been solution centered while inservice education seeks to support the professional teacher in his/her task of trying to answer questions for him/herself by means of problem centered approach. The majority of Trade and Industrial (T & I) education instructors are generally recruited from a wide range of sources, including the public school system, business, industry, and four-year institutions, and characteristically are unprepared for employment as instructors in the community college. They are, however, required to enroll in college courses to meet teacher certification requirements while teaching. Such expectation led Dillon (1974) to suggest that:

> we in education can take the easy road of continuing to apply a patch here and a poltice there, to convince ourselves that we are doing something significant for students because our staff

> members are engaged in a flurry of professional growth activities from a variety of sources (p. 140).

Today most persons and groups concerned about education heartily endorse stronger staff development programs. Perry (1980) viewed this commitment to staff development as amazing, considering the variation among each group's make-up, motivation, rationale, and proposed remedy. Although technical and vocational education teachers acknowledge the importance of keeping up to date in their technical specialties, and do engage in several professional growth activities, it is pertinent to investigate which activities and from what sources T & I instructors in community and technical colleges in the Midwest perceive effective for classroom/ laboratory instruction.

Instructional Change

The search for new programs and methods of instruction is a continuing one. Laudicina and Laudicina (1977) observed that the rate of acceptance of different and new educational reforms has been exceedingly slow. A study prepared under the auspices of the Carnegie Commission and reported in New York Times (1971) seemed to confirm that education has been basically unaffected by technological advance, and continues to operate as a handicraft industry. The study concluded that educational innovation, the developing of new teaching and learning forms, seemed to have lagged behind industry in adapting to our present technetronic age. Despite the great degree of reluctance toward change in our educational institutions, earlier studies by Mort and Cornell (1941) indicate that

school systems existed in which there are teachers who are highly trained and accepting of modern educational practices. Fullman (1972) found that when there is acceptance of an innovation by a teacher, rarely is the degree of utilization known. The degree of utilization or Levels of Use (LoU) represents one part of the complex process of innovation adoption.

In his critique, Carlson (1968) stressed that one of the distinctive aspects of educational diffusion is that it often occurs within bureaucratic structures. Rogers (1983) also noted that many more of the innovation decisions in education are authority and collective decisions rather than optional innovation decisions, but quickly pointed out that the adoption or rejection of an innovation is a decision by an individual. In the case of the school system, Hall et al. (1975) maintained that teachers and professors "demonstrate a wide variation in the type and degree of their use of an innovation" (p. 75). However, Hall and Loucks (1977) had suggested that implementation of innovations such as curriculum products and processes is not a bipolar use/nonuse phenomenon. Rather, as proposed in the concerns-base adoption model (Hall et al., 1973), there are different Levels of Use (LoU) of the innovation. The content of the LoU dimension (Appendix B) is the behaviors of users and nonusers. They also maintained that the focus is not on how users feel, but on what they do in relation to the innovation.

Problem of the Study

Professionals responsible for T & I programs strive to equip students to meet the job expectations of their employers. This study was designed to investigate the nature, scope, or extent of participation and

adoption of staff development practices by T & I instructors in community/junior and technical colleges in the selected Midwest states of Iowa, Missouri, and Nebraska.

Purpose of the Study

Since disparity exists regarding the most effective mode of staff development for T & I, this study was developed to determine participants' extent of use and assessment of the effectiveness of four groups of staff development practices. A second purpose was to determine the level of implementation/adoption of innovative instructional techniques and procedures learned during staff development sessions.

Need for the Study

In a study of staff development goals and activities of U.S. community colleges, Smith (1981) recommended that:

> Colleges offer a variety of staff development programs for each of their staff development groups and that research be conducted to determine participants' perceptions of the usefulness of various staff development practices (p. 209).

T & I instructors are in need of a systematic, planned program of continued professional development. In their study of the effect of an in-service institute on the attitudes of vocational instructors towards the teaching-learning process, King and Scott (1972) concluded that the evidence supported the implication that attitudes toward selected teaching/learning concepts can be changed. They recommend that "Additional research should be made to identify all experiences considered essential

to the initial success of beginning vocational instructors" (p. 31). A starting point for T & I instructors beginning to teach in community and technical colleges would be to determine which staff development practices are perceived useful in enhancing teaching and learning in the occupational areas.

Industry spends considerable sums of money to upgrade the performance of professional technical and middle management personnel. The New Jersey Educational Association (NJEA, 1971) maintained that schools make little comparable effort to upgrade the efficiency of their professional personnel—the teachers. Echoing the trend, Strong and Schaefer (1975) stated that "it is unfortunately true that in the vocational education profession it is by chance that teachers keep up-to-date with occupational technology" (p. 158). They noted that trade, industry, and technical education cannot be any better than the personnel who staff its programs. If one accepts this proposition as self-evident, Strong and Schaefer then contended that the concern for staff recruitment and development takes an increasing emphasis.

Brown (1976) noted that during the past decade or two, social, economical, and technical changes in our society have had unprecedented effects on Vocational Technical Education. Cheney (1970) helped to clarify these changes and stated:

> Because the objectives of technical education are pegged to a higher level and because of the differentness of the students, the pedagogical competencies required of the technical teacher vary considerably from those required of other vocational teachers (p. 27).

In order for T & I instructors to be adequately prepared to provide quality instruction, categories of staff development practices need to be identified that will best equip beginning instructors as well as other instructors with the needed skills necessary in today's community and technical colleges. In discussing the university role in the preparation of post-secondary teachers, Harper (1973) suggests that "staff development is a growing problem for community and junior colleges. . .there is a need for stepped-up efforts in both preservice and inservice training" (p. 5). This observation implies that an Industrial Vocational instructor must be current in instructional up-to-date skills and knowledge. A necessary aspect of the stepped-up effort would be a follow-up of T & I development trainees to determine their current Level of Use (LoU) of instructional innovative practices in their classroom/laboratory teaching. This need also stems from Hall's (1976) suggestion:

> We know that there is not widespread diffusion and use of many educational innovations that have been recently developed. . . . At the system level, there have been additions of curricula, new organizational structures, and other things; however, on the individual level, there is little change—just system overload (p. 22).

In the Spring 1984 NAITTE Newsletter, the Vice President for T & I Education stressed the need for T & I staff development for the new, emerging, and changing occupations and jobs in the U.S. He aptly stated that:

> In the midst of the national concern for excellence in education and the changing needs of the workforce, it is clear that we must take a long hard look at our methods of identifying which occupations and jobs to teach, our methods of deriving

> course content, our delivery systems, the roles of our instructors, and our methods of preparing them (Bradley, 1984, p. 3).

It is therefore apparent that clear messages from within the profession, employers, the workforce, and from almost every other segment of the American society indicate the need for research in T & I staff development especially as "our workforce is going 'Hi-Tech'."

Research Questions and Hypotheses of the Study

Research questions

1. What is the estimate of Trade and Industrial (T & I) instructors' perceived effectiveness of staff development practices in the community and technical colleges?
2. What is the estimate of T & I instructors' perceived effectiveness of the innovative curriculum and instructional practices in the community and technical colleges?

Research hypotheses

1. It is hypothesized that there are no significant differences in the instructors' participation in formal staff development training within the last three years (1981-1983) by age, number of years spent in present school district, number of professional education journals read per month, level of education, trade cluster, location of present school, and membership in professional organization.
2. It is hypothesized that there are no significant relationships

between the instructors' degree of perceived 'extent of use' in selected categories of staff development practices by level of education, trade cluster, and level of satisfaction in college teaching.

3. It is hypothesized that there are no significant relationships between the instructors' use and nonuse of innovative instructional practices by level of education, trade cluster, and level of satisfaction in college teaching.

Assumptions of the Study

1. The provision of staff development opportunities is a natural part of a college system's function.
2. Given a choice in staff development activities, a staff member will choose an activity that has meaning and value to him/her.
3. Professional learning is an adaptive and heuristic process.
4. The primary unit of adoption is the individual teacher.

Limitations of the Study

1. The subjects of this study were limited to full-time T & I instructors in community/junior and technical colleges in the three Midwest states of Iowa, Missouri, and Nebraska.
2. The findings of this study were generalized only to the Midwest states covered in the study.
3. The small number (2) or no response from female instructors limits the results of the findings to the male population.
4. The final limitation arises from the modification of Hall and Loucks

(1977) Levels of Use of innovation which are distinct states that represent different types of patterns of innovation use as exhibited by individuals and groups.

General Methodology

Population and Sample: This study involved the use of questionnaires to survey randomly selected T & I faculty members in public and noncollegiate post-secondary schools within occupational programs. The schools comprise community/junior colleges, vocational/technical colleges, and technical institutes. The Midwest states included in the study (Iowa, Missouri, and Nebraska) were randomly selected from the ten states normally designated as Midwest states. However, the inclusion of Iowa in the random sample was a determining factor in the choice of states. The sample comprised 300 T & I instructors.

Instrument: A four-page questionnaire was generated from three sources. Permission was sought from John Centra to use part of his instrument on staff development which he constructed in 1976 to determine the status of faculty development programs in colleges and universities in the U.S. Permission was also granted by Al Smith to incorporate relevant portions of his 1980 instrument on a survey of community college staff goals and development practices. Specific questionnaire items from extensive review of the literature related to occupational education programs were formulated for each of Sections I through IV of the questionnaire. The scale on Level of Use (LoU) was a modification of Hall and Loucks' (1977) rating scale.

Data

The questionnaires were mailed in December 1983 with prepaid return envelopes to T & I instructors in community and technical colleges in Iowa, Missouri, and Nebraska. A follow-up mailing card was sent after 1983 Christmas break requesting instructors who had not completed their responses to do so and return them. The data provided information that was analyzed to answer the basic research questions. Table 1 shows the rate of return of completed questionnaires by respondents from the community and technical colleges.

Table 1. Rate of return of completed questionnaires by type of college

Two-Year College	No. of Mailed Questionnaires	No. of Respondents	Percent
Technical	150	55	36.7
Community/Junior	150	65	43.3
Total	300	120	40.0

Data Analyses

Pertinent data summaries were developed. Data provided for analysis were derived from responses to specific questionnaire items which were grouped under components related to each hypothesis. Item frequencies and response rates for each item were calculated, reviewed, and analyzed. Although the factors of primary interest were identified a priori,

individual items were subjected to factor analysis using the principal factoring and varimax rotation. Factor analysis was utilized to help characterize the meaningful factors describing the data on staff development practices and instructional innovation strategies. One-way analyses of variance were performed to test the null hypothesis of group means of T & I instructors. In general, the data of the questionnaire were analyzed and reported, using the language of the SPSS Inc. (1983) User's Guide manual. The results of the various statistical analysis applied in this study are presented in chapter IV.

Caution was observed, however, in generalizing the data analyzed to the entire population of T & I instructors in the Midwest due to the potential effects of nonresponse bias and the fact that not all the states in the Midwest were used in the survey. According to Hawkins (1974) nonresponse bias may have differentiated effects on variable means. In a recent study, Passmore (1981) found that surveys in occupational programs are often subject to considerable nonresponse.

Conclusion: Appropriate conclusions and interpretations were made based on the findings of this study. Areas for further study were recommended based on the findings of this study.

Definition of Terms

Specific operational terms or phrases used in this study have been defined as follows:

Community College - a two-year post-secondary institution operated by the board of education of a state or local basic administrative unit/units.

Instruction is adapted in content, level, and schedule for the various needs of the local community or state. Community college is also used as a referent for both community and junior colleges.

Curriculum - the series of courses designed to cover the instruction in a designated field. It may refer also to the whole body of courses offered in an educational institution.

Innovation - those attempts that change in an educational system which are consciously and purposefully directed with the aim of improving the present system. Innovation is not necessarily something new but it is something better and can be demonstrated as such (CERI, 1969, p. 13). Educational innovations frequently require teachers to change attitudes, relationships and roles.

Instruction - the activities dealing directly with the teaching of students and with improving the quality of teaching. Teaching is the major aspect of instruction, and may be provided for students in a classroom or in another location. It may be provided by direct pupil-teacher interaction or through some other approved medium such as television, radio, telephone, and correspondence (U.S. Office of Education, 1970).

Occupational Education - instruction designed to provide the student with job skills necessary for employment or acquired for retraining or advancement in one's present occupation. This form of education is for occupations categorized as semi-skilled, skilled (including apprenticeable trades), technical and semi-professional. Occupations generally requiring a baccalaureate or higher degree for entry are not part of this form of education.

Staff Development - the sum of all planned activities designed for the purpose of improving, expanding, and renewing the skills, knowledge, and abilities of participants. This includes institutes, workshops, seminars, special purpose meetings in and out of school, as well as in and out of education (Hendee, 1976, p. 163).

Teacher-Educator - a qualified professional person responsible for the preparation and inservice training of teachers. He/She assists teachers or prospective teachers to secure the professional knowledge, ability, understanding, and appreciation which will enable them to meet certification requirements or advance in teaching positions.

Teacher - Strong and Schaefer (1975) describe the Vocational Industrial teacher as one who must first be an experienced and competent craftsman. In his collegiate preparation, he/she must have emphasis to the sciences, drafting and design, mathematics, techniques of teaching, and considerable contact with the humanities and arts (p. 58). Teacher is used with reference to the person who instructs post-secondary students. The term instructor, is used interchangeably with teacher.

Technical College - a further education institution maintained by local education authorities and providing a mainly vocational education (chiefly technical and commercial subjects) for students over the age of 16 (Rowntree, p. 315).

Trade and Industrial Education - the program of Vocational Education designed to develop manipulative skills, safety judgments, trade ethics, leadership abilities, technical knowledge, and related occupational information which prepares individuals for initial employment, or upgrades

or retrains out-of-school youth and adult workers in trade, technical, and industrial occupations (NAITE, 1975, p. 3).

Vocational Education - in its broadest sense, it is defined by American Vocational Association and quoted by Strong and Schaefer (1975) as:

> Vocational or technical training or retraining which is given in schools or classes (including field or laboratory work and remedial or related academic and technical instruction incident thereto) under public supervision and control or under contract with a state board or local education agency, and is conducted as part of a program designed to prepare individuals for gainful employment as semiskilled or skilled workers or technicians or subprofessionals in recognized occupations and in new and emerging occupations, or to prepare individuals for enrollment in advanced technical education programs, but excluding any programs, to prepare individuals for employment in occupations generally considered professional or which require a baccalaureate or higher degree (p. 59).

Workshop - programs in which individuals with common interest and problems meet, often with experts, to exchange information and earn needed skills and techniques. These include summer workshops, conferences, institutes (training programs), seminars, minicourses, and meetings (Thesaurus, 1982, p. 267).

CHAPTER II. REVIEW OF THE LITERATURE

Staff development programs directed toward the improvement of instruction have the potential for exerting a significant impact on the entire system of education. Quality teaching has emerged as a professional imperative in today's colleges. With the advent of large-scale growth in two-year vocational-technical colleges, there is an emerging need to examine the construct of staff development practices and to determine its potential for guiding the development and placement of Trade and Industrial instructors.

A review of the literature indicates that few studies of this nature have been addressed. This chapter will examine staff development in community and technical colleges. Topical areas will include: what staff development is; staff development practices; occupational education in the community college; practices in the training of T & I instructors; faculty involvement in staff development studies; educational innovation, adoption, diffusion, and implementation.

What is Staff Development?

As Ducharme (1981) indicated, staff development has meant a number of things in the literature and in practice: improvement or development of faculty skills in advising and teaching, growth in scholarship and research capacity, and acquisition of new skills or training for redirection. The views of some educators and researchers are addressed without any attempt to be judgmental.

Staff development in schools and colleges consists of all the

experiences that are provided or recognized by the school as being important for, and contributing to the personal and professional growth of the employees. Less formally, Kelley (1978), suggested that staff development includes all those activities sponsored or recognized by the school district to help employees do their work better and with greater satisfaction. In relation to the community college, Hammons and Wallace (1974) defined staff development as inservice programs designed to improve the professional competencies of those already serving in the college. They contended that the need for staff development is accentuated by the constantly changing nature of the two-year college—new clientele, the need for constant improvement in efficiency and effectiveness, the need for community college staff simply to become acclimated to the constant need for change. While supporting this view, Gardner (1963) added that staff development also assumes the need for renewal. Wolansky et al. (1981) suggested that "the improvement of classroom instruction is the main goal of inservice education" (p. 213). However, Dale (1982) and Schultz and Torrie (1983) are concerned that more and more authors use the term staff development and inservice education interchangeably. Dale has defined staff development as the totality of educational and personal experiences that contribute toward an individual's competence and satisfaction in an assigned professional role. Based on this, he concluded that inservice education is but one of the several functions of staff development.

The whole purpose of staff development is seen by Sealey (1978) as improved learning in the schools. This attribute enhanced Brimm and

Tollett's (1974) recommendation that effort should be made to implement programs which represent concepts and develop skills transferable to the problems of daily classroom life and college operations. Staff development thus suggests a different approach to improvement, one that considers the effects of the individual instructor on the whole college staff and the necessity of long-term growth (development).

Effective staff development is thus dependent upon institutional and personal commitment towards the improvement of programs offered and skills available for use in the delivery of instructional programs.

Staff Development Activities

Staff development activities are recognized as being important when they are judged, before or after the fact, as contributing to indirect or direct outcomes (Kelley, 1978). Indirect outcomes, according to Kelley are represented by change in the behavior of staff members or the organization while direct outcomes are defined as changes in student outcomes attributable to experiences of staff members in a staff development program or activity.

In considering activities, Bishop (1976) suggested the following seven 'standard staff development practices'. The categories are as follows:

- School Related Courses, Seminars, Institutes, Conferences, and Workshops: This category, according to Bishop, refers to professionally endorsed activities that may or may not be directly under the aegis of a school or school district. Participation in the activities may be voluntary or compulsory, carry university and/or certification

credit, and involve some monetary remuneration.

- Inter- and Intra-School Programs, Activities, and Projects: Staff development practices included in this category are designed to occur in the school building or district level. Specific practices may involve meetings, inservice programs, and differentiated team assignments and projects.
- Consultant Directed Programs: Staff development programs may employ persons with expertise in a desired area to work on a continuing basis with school personnel. Consultants may come from within or outside the system utilizing their services.
- Production and Use of Instructional Media, Resources, and Materials: Mediated instruction, learning packets, and modules are among the resources available for use in these programs.
- Individual Centered Personal and Professional Growth Plans: Plans comprising this category may stress individually targeted activities where teachers identify objectives and work with supervisors or peers regarding means, progress, standard, and evaluation.
- School or Regional Consortia Programs: Programs in this category emphasize a professional partnership among schools, districts, or regional facilities.
- Extended Year Programs and Assignments: This category covers programs and assignments that may extend beyond the usual school year (p. 18-19).

On the other hand, Smith (1981) grouped staff development practices under five categories:

- Workshops, Seminars, and Programs
- Analysis and Assessment Practices
- Media, Technology, and Course Development
- Institution-wide Practices
- Miscellaneous Practices which include use of grants by staff for visitation, exchange programs, and college credit courses.

Yet another classification by Dale (1982) groups activities in terms of several functions of staff development:

- Inservice Education - Improving skills; implementing curricula, procedures; expanding subject matter knowledge; planning and organizing instruction; increasing personal effectiveness.
- Organization Development - Building program climate; solving problems; increasing personal effectiveness.
- Consultation - Conducting workshops; assisting with building staff development and evaluation; assisting with administrative planning.
- Communication and Coordination - Assisting with inter-building communication; organizing and providing information about resources; assisting with communication between administration and staff; providing central coordinating service.
- Leadership - Providing suggestions for new curricular, instructional approaches; informing about innovative approaches; identifying problems and suggesting solutions; researching ideas for evaluating practices and procedures; providing assistance with innovative process.

- Evaluation - Conducting needs assessments; evaluating resources; evaluating staff development efforts (p. 31).

The National Center for Research in Vocational Education at Ohio State University made up its own classification based on the "wide variety of activities and devices in the literature which can be used to provide post-secondary instructors with needed pedagogical skills." Their classification was categorized by Harrington et al. (1978) and included:

- Inservice activities at the institution: guest speakers, seminars, practicums, workshops, institutes, research projects, use of modules, pairing an inexperienced teacher with an experienced teacher, orientation sessions, encounter groups, etc.
- Outside activities: workshops, seminars, professional organization conventions, staff exchanges, visitations to other institutions, staff retreats, etc.
- University course work: such work can be required for certification, or encouraged by reimbursements, fee waivers, state grants, sabbaticals, etc.
- Internships (p. 49).

Whatever the focus or organizing scheme for instructional improvement, Bishop (1976) suggested that alternatives are needed to accommodate the range of individual perceptions, abilities, and style preferences. The approaches should be designed to facilitate the desired gains in staff attitudes and competencies including organizational, curricular, and instructional changes (Mulhern & McKay, 1972; Unruh, 1972).

Occupational Education in the Community College

According to Miller-Beach (1978) the accelerated interest in occupational education at the two-year post-secondary level was recognized in the passage of Title X of the Education Amendments of 1972. Seventy-five percent of all occupational education is offered in community colleges (Shworles, 1976). The literature regarding community colleges clearly emphasize an institutional philosophy based on the "egalitarian premise that each individual should be allowed to develop the limits of his/her capabilities" (Medsker & Tillery, 1971, p. 14). These institutions, proclaimed as 'the people's colleges', epitomize the American aspiration that "education and as much of it as can be obtained shall be open to all citizens" (Garrison, 1968, p. 6). Glenn (1976) observed that community colleges:

> are basically teaching institutions and represent: opportunity to individuals in the lower economic percentile who want to better their income and live more comfortably in society; a place where individuals can develop employment skills, upgrade their current employment occupations; and a way for individuals to pursue vocational interest . . . (p. 17).

Miller-Beach indicated that the complexity of the innovation, coupled with the rapid expansion of education have resulted in a critical need for staff development programs designed specifically for occupational teachers. This concern was also articulated by Hammons and Wallace (1976) as they maintained that "community colleges have never had staffs trained specifically to meet special problems of their students" (p. 1).

Practices in the Training of T & I Instructors

The literature differs widely on the issue of educational preparation of two-year college instructors. Most authors (Finch, 1969; Reese & Orr, 1971; Strong, 1970; Sugarman, 1974) agree that teaching at the two-year college level differs appreciably from teaching at other levels. The master's degree is the present standard for teaching in the academic areas in two-year colleges (Gleazer, 1968; Kelley & Wilbur, 1970; Thornton, 1966). Graduate programs in many technical specialties are simply nonexistent.

In a discussion of instructional technology, McClelland and Bushnell (1974) pointed out that staff development programs must "not only feature mastery of the equipment, but, more importantly . . . train teachers to make full use of it in the instructional process" (p. 16). The drafters of the Smith-Hughes Act of 1917, according to Strong (1970) recognized that teachers in the present school system did not have the proper qualifications for teaching industry-related programs. They also held the conviction that the structure and practice used to prepare academic teachers of that day were not appropriate for training trade and industrial teachers. State Boards of Vocational Education were, and mostly are, made responsible for occupational teacher education. However, most states have delegated the responsibility to one or more universities within their borders for the actual conducting of occupational teacher education programs. Strong then argued that since most T & I instructors enter the field without degrees, the need for intensive inservice training in skills of teaching is critical.

Faculty Involvement in Staff Development Studies

Closely related to staff development practices is the decision regarding what the staff development needs should be. A logical place to start is with the individual staff member. In the words of Leofforge (1971):

> Only the instructor can identify the training needs he really wants to meet; only he can implement the changes in his instruction resulting from training; and only he can make the evaluation become an instrument for further development (p. 13).

Although Hammons and Wallace (1974) maintain that involvement of participants in planning has the obvious advantage of helping to avoid some of the traditional reasons for staff resistance to inservice programs, they see the obvious disadvantage of having staff define their own needs as the difficulties inherent in going to the constituency on any issue (the time required, the possibility for polarization, and so on). In a study of T & I teachers' perception of inservice instructional competencies, Gorman (1978) found that considerable disagreement existed between teachers and administrators over what should be emphasized during inservice programs. While the consensus among educators is that staff involvement plays a significant role in the success of any instructional development program, researchers have given little or no attention to the perceptions of the teaching staff (Ingersoll, 1976; Plavins & Schill, 1980). This is also evident from studies conducted on staff/faculty development or inservice programs on a national or regional basis by

Centra (1976), Ellerbe (1980), and Smith (1981). Generally, the respondents were directors of instructional development or faculty development, deans or associate deans, or faculty members spending part time as coordinators (Centra, 1978). The actual teaching staff were not part of the sample. Yet significant conclusions were drawn from the studies to relate to the entire staff of the school.

From a different perspective, Hammons and Wallace (1974) maintained that "community colleges have never had staffs trained specifically to meet special problems of their students" (p. 1). This view is attributable to the necessity of hiring partially prepared professionals during the 1960s and the prevalent shortage of teaching professionals, according to Hammons and Wallace. Up to date, no studies have countered the findings of Hammons and Wallace. On a restricted survey in terms of geographic coverage, Bloom (1976) surveyed community college instructors in the state of Illinois to investigate their professional development practices. In determining the sample size, he used a judgmental approach rather than a probability sample approach. The mean frequency ranking across subjects was the only statistical analysis he used to arrive at conclusions. This survey served as a pilot study in terms of the statistical methodology rather than a reliable research study dealing with occupational instructors. O'Banion's (1974) appeal that "the priority of the future is a priority on persons, on the needs of the people who staff the people's college" (p. 25) creates a challenge to researchers of involving the teachers themselves in future staff development studies.

Educational Innovation

Innovation, the idea that colleges should always be promoting new ideas and programs, has been a major thrust in American education (Shanker, 1981). Innovation here, refers to specific changes in instructional practices. Although the results of the innovative educational efforts of the sixties were viewed as a massive failure (Mann, 1976; McLaughin, 1975), Rivlin (1971) argued that the sixties represent an era of random innovation and that its failure was attributable to the lack of good program design and experimentation capable of evaluating the relationship of system inputs to outputs. She then suggested that it was still possible to achieve the sixties' goals through systematic experimentation and use of more effective measures.

Two trends have, however, tempered the faith in innovation in the eighties. The first is described in part by Papagiannis et al. (1982) as a consequence of the no significant difference finding in educational research and the resurgence of attention to productivity in the economy as a whole. The second trend is the increasing concern with implementation of educational innovation. Pincus (1974), Fullan and Pomfret (1977), and Hurst (1978) have all in one way or the other attributed the neglect of implementation issues as a major cause of the failure of innovative projects by schools, teachers, and even students. These groups were often seen as 'short-sighted, change-resistant forces who have to be co-opted into adopting innovations that will ultimately benefit them.'

A complementary focus was, however, offered by Gaff (1975). He pointed out that although traditional instructional methods have been

criticized and that there are a number of alternative procedures available, few teachers have had any first hand experience with them. Gaff insists that teachers have a genuine interest in developing skills in innovative methods of instruction. Trow (1970) maintained that innovation dispels, if only briefly, "the fog of boredom that hovers over everything we do in our classrooms" (p. 291). This unusual viewpoint is taken even further by the suggestion that innovations in education can be justified for their own sake regardless of their outcomes (Nicholls, 1983). Pellegrin (1967) suggested a number of specific and significant sources of innovations—classroom teachers, administrators, school board, lay public, state departments of education, education faculties in colleges and universities, professional associations, the United States Office of Education and other federal government agencies, textbook publishers, and experts. Classroom teachers come first in his list and thus suggests the importance of this group of professionals to the improvement of instruction and learning in schools and colleges. One factor which sometimes makes it difficult to persuade teachers to become involved in innovation is the difficulty of showing that the innovation will be more successful than present practice (Nicholls, 1983). Indeed, the problem common in education is how to show that there is improvement.

The survey of directors of instructional-improvement programs and centers conducted as one phase of the study on Faculty Renewal and funded by Exxon Education Foundation was reported by Gaff (1975). This study revealed the strong sentiment that the "overall climate at institutions

in regard to teaching improvement" has become more favorable over the last couple of years.

Characteristics of Innovation

In addition to the way in which innovations are developed and disseminated, Nicholls (1983) claims that certain characteristics are important factors in determining the extent to which they are adopted and implemented. As Barnett (1953) put it:

> the reception given to a new idea is not fortuitous and unpredictable as it sometimes appears to be. The character of the idea itself is an important determinant (p. 313).

There is certainly much in common on the several classification of characteristics of innovations presented in the literature (Barnett, 1953; Havelock, 1969; Klonglan et al., 1967; Miles, 1964; Rogers & Shoemaker, 1971; Rogers, 1983). Rogers identified five characteristics:

- Relative Advantage - the degree to which an innovation is perceived as better than the idea or practice it supersedes. Usually in education the concern is for an improvement in student learning.
- Compatibility - the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and present needs of potential users.
- Complexity - the degree to which an innovation is perceived as relatively difficult to understand and use.
- Triability - the degree to which an innovation may be experimented with on a limited basis.

- Observability - the degree to which the results of an innovation are visible to others (p. 15-16).

Although Rogers and Shoemaker (1971) acknowledged the absence of conclusive research evidence on the effects of complexity, they strongly expressed the view that the complexity of an innovation, as perceived by members of a social system, is positively related to its rate of adoption. In terms of triability, they also came to the same conclusion. Nicholls (1983), however, argues that their statement regarding triability is not likely to hold up in the field of education. Nicholls drew his own conclusion by citing the fact that the research evidence quoted to support their generalization was not drawn from education. Rogers (1983) believes that observability is positively related to the adoption of an innovation. There is, however, some support from the field of education for this view. Dickinson (1975) found that in the schools he used for his research, there was an acceptance of innovation that could be seen to work successfully in other schools.

The Adoption of Innovation

Adoption of educational practices is only one means by which school systems attempt to adjust to their environment. The adoption of new educational practices, practices which according to Carlson (1965) alter the instructional program, seems to be at the center of the issue as school systems attempt to provide an adequate education for their clients. In general, Papagiannis et al. (1982) contend that much more attention is paid to innovation adoption, implementation, and evaluation than to the generation of innovations. Model programs were seen as

naturally transferable (Bowers, 1978; House, 1974). However, Papagiannis and his colleagues noted that more recent work has recognized that there are barriers to the adoption of educational innovations.

Hurst (1978) discussed the literature concerning almost every type of factor that can be related to innovation, adoption, and implementation. He finally concluded that adopters (farmers, urban dwellers, teachers, schools, etc.) are no longer viewed as ignorant, tradition-bound, lazy and irrational, but are seen as reasonable and rational, even if often risk-averse (Andreski, 1972; Shultz, 1964). Klonglan et al. (1967) found that the personal attributes of an individual (the change agent) are important variables in understanding the adoption-diffusion concept of any innovation. Pincus (1974) characterized local school systems in the U.S. as bureaucratically organized monopolies of a peculiar nature—they are not market oriented; have public sector protection, and a captive clientele; are subject to public scrutiny, and that neither goals nor the means to attain them are clear. Thus, the adoption of educational innovations in this context will have little, if anything, to do with improving efficiency. He went on to suggest that schools will resist efforts to bring about major changes in instructional methods or organizational structure. Carlson (1965) had refuted such notions put forward by Pincus. In his argument, Carlson maintained that because school systems are self-conscious about their significant purposes, and exist in a rapidly developing culture in which knowledge is greatly expanding and technological advances are common place, they (the school

systems) are pressed to and do seek change in their educational practices.

The Diffusion of Innovation

Rogers (1983) defined diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system (p. 5). He went on to explain that diffusion is a special type of communication, in that the messages are concerned with new ideas. The result of the Columbia University diffusion studies found that a considerable time lag was required for widespread adoption of new educational ideas. The success or failure of diffusion programs rests, in part, on the role of opinion leaders and their relationship with change agents. In the school situation, these will be the administrators and teachers, respectively.

In his study of the diffusion of instructional television (ITV), Evans (1968) found that cosmopolite faculty members (those who travel frequently and identify with a disciplinary reference group) tended to have more of a favorable attitude toward ITV than localites (those oriented more toward their own campus). Unfortunately, Evans' study employed a precursor to actual adoption as a criterion variable. This is a major weakness in the design.

The Implementation of Innovation

Implementation refers to the actual use of an innovation or what an innovation consists of in practice. This differs from both intended or planned use and from decision to use, the latter being defined as

adoption (Fullan & Pomfret, 1977, p. 336). In their review of research, Fullan and Pomfret delineated two characteristics of innovation that stood out as being related to implementation—explicitness and complexity or degree of difficulty of change required by the innovation. Gross et al. (1971) found that the majority of teachers in their case study were unable to identify the essential features of the innovation they were using. In summarizing four case studies of differentiated staffing, Charters and Pellegrin (1973) stated that the innovation was described in abstract global terms with consequent ambiguity on the part of the teachers as to what the change entailed behaviorally. Similar findings were reported by Crowther (1972), Downey et al. (1975), Lukas and Wohlleb (1973), and Naumann-Etienne (1974). This is unfortunate and may reveal the fact that most teachers are lackadaisical in or were not knowledgeable about the particular innovation(s) during the staff development program. The reason one might, therefore, advance for such instructors for trying to implement the innovation(s) would be to fulfill certain required obligations by the building principal or school board.

In analyzing studies on complexity of innovation, Gross et al. (1971) and Evans and Scheffer (1974) found that implementation characteristics involving new teaching strategies and role relationships with students showed lower levels of implementation than those characteristics involving change in structure, administrative procedures and use of materials. Crowther (1972) measured complexity by teachers and found that it was significantly related to the degree of implementation of a social science curriculum. The problem with this study is that he

referred to degree of implementation as a rate of adoption.

Other studies have concluded that successful implementation is much more complex and difficult than one might expect (Fullan & Pomfret, 1977; Lortie, 1975; Miles, 1979; Sarason, 1971). However, Fullan and Park (1981) have suggested that "implementation will occur to the extent that each and every teacher has the opportunity to work out the meaning of the implementation in practice" (p. 27) and when they had the opportunity to change their behavior, skills and beliefs.

The Evaluation of Innovation

Although there is a growing literature in evaluation of innovation, many researchers (House, 1978; Hurst, 1978; McLaughlin, 1975) suggested that research and evaluation activities analyzing educational innovations have not revealed much. Nevertheless, there is a growing optimism about the utility of future research and continuous development of new models to evaluate innovation (Papagiannis et al., 1982). Manatt et al. (1976) maintained that evaluation is at the very least a political and social requirement and at best a tool for improvement of instruction. They went on to suggest that an evaluation system should be as objective as possible. In effect, the system should evaluate only behaviors related to pupil-teacher interaction and provide due process.

The evaluation literature makes a distinction between summative evaluation (judgment made at the conclusion of a period of study) and formative evaluation (judgment drawn periodically to help redesign or modify a course of action) (Bloom et al., 1971; Lieberman & Miller, 1979). Certain studies of innovations revealed teachers' neglect of

evaluation (Gross et al., 1971; Nicholls, 1979; Smith & Keith, 1980). Nicholls (1983) believes that when there is an emotional involvement of teachers in an innovation they are unlikely to recognize any weaknesses or deficiencies in the innovation. He, however, cautioned that this view should not deter any recognized effort on the part of teachers and administrators to evaluate any program, curriculum or instructional change. Nicholls, however, considered summative evaluation to be inappropriate unless an innovation is to be discarded. He went on to suggest a wider view of evaluation, one which "embraces both the innovation itself and the activities of innovating" (evaluation as a process).

Teachers want to improve as they move along. According to Lieberman and Miller (1979), appropriate evaluation procedures can help teachers improve as they move along, provided the data are gathered over time and returned, along with conclusions drawn from them, to the teachers in the process and to the administrators and teacher educators and other monitors of the innovative process.

Conclusion

This review of the literature has been organized to highlight studies related to staff development, adoption, diffusion, implementation, and evaluation of acquired educational practices. The literature is extensive and what has been presented is only a partial review, necessarily, due to the scope and depth of the subject. Much of the previous research is limited in its inclusion of Trade and Industrial teachers' expressed needs as the basis of staff development.

However, the findings, proposals, and instruments reported by authors and researchers did aid this researcher in the design of the study, development of the survey instrument, and data analyses. One constraint of this study is that it represents a regional rather than a national sample. The review of the research confirmed that much more research needs to be conducted in this important area if Trade and Industrial education teachers are to acquire and retain the competencies that will be critical to them and their students' success. The discipline of education has a great deal of expertise to offer Trade and Industrial instructors, professionals caught in the knowledge explosion of high-technology, professionals who must continually train and be trained. It is hoped that the findings of this study would serve the T & I instructors well in their effort at initial and continuing professional development.

CHAPTER III. METHODOLOGY

This section includes a description of the methods employed to identify the population, design the instrument, and collect and analyze data from a randomly selected sample of the identified population. Approval for the survey was obtained from the Iowa State University Human Subjects (Research) Committee. The response rate is reported for each of the samples from the included Midwest states.

Subjects

The subjects of this study consisted of full-time Trade and Industrial (T & I) education instructors in public community/junior and technical colleges in Iowa, Missouri, and Nebraska. In order to secure a representative sample from the states, the community and technical college instructors were stratified into four clusters—Graphic Communications, Materials and Processes, Power and Energy, and Construction trades. The suggestion of McQuitty (1963) to use the original data matrix for clustering individuals, was utilized for the T & I instructors. This procedure, according to Gorsuch (1983), provides an empirical method of producing typologies. The T & I instructors in the various trade clusters were randomly selected from each of the colleges (community and technical colleges). Programs in the clusters were selected based on the delineation of cluster programs recommended by the Industrial Education and Technology Department, Iowa State University, Ames, Iowa.

A total of 120 (40%) T & I instructors out of 300 who were mailed questionnaires, responded. Fifteen of the returned questionnaires were

totally unusable either because the information provided was incomplete or the original respondents had left out the college designation and also erased the identification mark. Responses from 105 (35%) instructors were analyzed to attain the findings of the study. This number reflects the total usable responses after initial mailing of the questionnaires and a follow-up mailing card to subjects, requesting their completion and return of the questionnaires. Only two out of 105 usable responses belong to the female respondents. This low representation from the female subjects rendered the use of sex as a variable for comparison inadvisable. The response rate within the four clusters of T & I instructors by state is presented in Table 2. The researcher wishes to emphasize that Iowa was chosen a priori in the random selection of the three, out of the ten Midwest states.

Table 2. Response rate of T & I instructors by clusters and states

Cluster	Iowa	Missouri	Nebraska	Total
Graphic Communications	10 (18.2%)	4 (16.7%)	8 (30.8%)	22
Materials and Processes	13 (23.6%)	8 (33.3%)	8 (30.8%)	29
Power and Energy	24 (43.6%)	9 (37.5%)	9 (34.6%)	42
Construction	8 (14.6%)	3 (12.5%)	1 (3.8%)	12
Total	55 (100.0%)	24 (100.0%)	26 (100.0%)	105

Instrumentation

The data-gathering instrument consisted of a four-page questionnaire and a letter (Appendices A and B) explaining the purpose of the study of staff development practices and innovative instructional methodologies of T & I instructors in community and technical colleges. Question content and format were developed from several similar studies (Bloom, 1967; Centra, 1978; Smith, 1981) and from consultations with leading Industrial Education faculty members at Iowa State University, Ames.

Checklist descriptions were used to obtain information on the demographic data. Major trades of T & I instructors were identified through responses to an open-ended question inquiring about their major occupational (trade) teaching area. The ratings on staff development practices were made on a five-point scale with 0 = Not used any time to 4 = Used over 50% of the time. Ratings on Levels of Use (LoU) of the instructional methodology were made on a six-point scale with 0 = Nonuse to 6 = Renewal. The only modification to Hall and Louck's (1977) Levels of Use (LoU) is the combination of levels IV-A and IV-B into a single level of 4, in this study. This modification was done to avoid confusion in subjects' response. The instructor's perceived estimation of the effectiveness of used innovative instructional methodology was rated on a five-point Likert-type scale, with 0 = No idea of Effectiveness to 4 = Very Effective.

The researcher wishes to identify some of the main difficulties encountered in the administration of the instrument.

1. Timing: Timing is a critical factor in mailing out any survey questionnaires. The mailing of the questionnaires for this study was ill-timed (just before 1983 Christmas holidays). Christmas season seems a rather awkward time for subjects to respond to questionnaires. The holiday mood significantly contributed to the low rate of response—40%.
2. Change-over in staff in and use of un-updated directory: Most state departments of public instruction do not compile the current year's teacher directories until after the fall semester. The state directories used to identify T & I instructors and their mailing addresses were 1982/83 staff directories instead of 1983/84 directories. Besides, many teachers either leave the school district at the end of the school year, i.e., June, or are re-allocated to another school within the school district. The effects of the change-over in staffing and use of un-updated directories contributed to a return-mail rate of 11 (3.7%) out of the 300 questionnaires mailed to the randomly selected T & I instructors in the three Midwest states.
3. Because of variable calendars, it was difficult to pick dates for mailing questionnaire surveys near the end of a term, when some colleges are already not in session.

Reliability and Validity

The major part of the data-gathering instrument has been validated by Centra (1976) and Smith (1980) who used the instrument in National

Surveys reported earlier in this study. However, since other important subsections and items were developed to fit the nature and scope of this study, the researcher subjected the instrument to factor analysis using the varimax rotation. Further, procedure reliability was performed on the item-grouping of the instrument which was based on past research and content. Decisions to regroup and/or drop items were made based on the results of the factor and reliability analyses. The final grouping of sections relating to Staff Development Practices (Section II of the Questionnaire) and Innovation in Curriculum and Instruction (Section IV of the Questionnaire) are presented in Tables 13 and 15.

Reliabilities for the various sections referred to have been analyzed. The analysis used was the Alpha Internal Consistency Reliability. The Internal Consistency Reliability for the sections are presented in Table 3.

Procedure

The researcher coded the returned and usable survey questionnaires which were then keypunched at the Iowa State University Computation Center. Frequencies were run on the data and verified. The data were then stored in a Wylbur file. A review of literature (Oscarson & Finch, 1980) indicated that instructor age, professional publications read on a monthly basis, years teaching in present district, and personal satisfaction with teaching were important predictive qualities in the adoption of educational innovations. These variables were included as independent variables in the study. Additional variables gathered from extensive

Table 3. Reliability of staff development practices and change and innovation in curriculum and instruction

Item Grouping for Scale	Number of items	Reliability coefficient
Section II. Staff Development Practices:		
A. Workshops, Seminars, Inservice Programs	11	.869
B. Analysis or Assessment Practices	8	.735
C. Miscellaneous Practices	7	.735
D. Media, Technology, Course Development	6	.726
Section IV. Change and Innovation in Instruction:		
A. Instructor Directed Strategy	8	.737
B. Student Directed Strategy	7	.710

literature reading were added—level of education, location of present school, recency of formal staff development training and membership in professional education or other occupational organizations. Oscarson (1977) referred to these variables as personal characteristics of instructors.

The researcher was interested in using the high order factors suggested by Gorsuch (1983) for this study for the following reasons: First, the general approach is to have a sufficiently large sample so that anything that would be of interest for interpretation would be significant. However, Gorsuch suggested that "the minimum significant correlation coefficient ($p \leq .05$) with an n of 100 is about 0.2; therefore,

only elements of S greater than an absolute value of 0.4 would be interpreted if the factor analysis was based on 100 individuals" (p. 209). He further maintained that the above figures are intended for problems with small to moderate size correlation matrices, and may be too conservative for problems with many variables" (p. 209). Second, higher-order factors are readily integrated into a confirmatory factor-analytic approach (Bentler & Weeks, 1980). Third, "primary factors do contain difficulty factors but high-order factors generally do not" (Gorsuch, 1983, p. 294). These general considerations were followed in constructing the scales listed in Table 3.

Frequencies and percentages were tabulated for each of the staff development practices and instructional innovations of factors extracted. One-way analyses of variance were performed on the scores related to staff development practices and instructional innovation, to determine whether any significant differences exist in the mean response among the T & I instructors. Any significant main effects ($p < .05$) were followed by examination of differences, using the Scheffe's method of multiple comparison. According to Kleinbaum and Kupper (1978), Scheffe's method is generally recommended when:

1. The sizes of the samples selected from the different populations are not all equal; and/or
2. Comparisons other than simple pairwise comparisons between two means are of interest (p. 271).

As several studies illustrate (Armstrong & Soelberg, 1968; Horn, 1967; Humphrey et al., 1969) random data often give results that can be

interpreted. They generally factored correlations among random variables with randomly assigned labels and found interpretable factors (Gorsuch, 1983). For this reason, Gorsuch suggested that the correlation matrix should always be tested for significance. The SPSS^X computer program used for this study included this check automatically.

In summary, the data were analyzed by the following procedures:

1. Frequencies and means
2. Factor analysis
3. Pearson correlation coefficients
4. Analyses of variance, including planned comparisons among treatment means
5. Chi-square test for category variables
6. Reliability scores for all factors.

In all cases, the statistical tests were computed using the SPSS^X program and the hypotheses were either rejected or failed to be rejected on the basis of the probability level supported by each statistical test.

Note: The convention of using the .05 and .01 levels of significance was utilized in determining the significance of all statistical results obtained by computer calculations. The symbol (*) was used in the tables provided in the following chapter to designate statistical findings that were significant at the .05 level, while the symbol (**) was used for higher significant statistical findings at the .01 level. The F-statistic (F-ratio obtained through the use of SPSS^X computer program in the single-classification analyses of variance could also be

derived by the use of the standard formula shown in Figure 1 (Popham and Sirotnik, p. 168-170).

The researcher's conclusions, implications, and recommendations presented in Chapter V were drawn on the basis of the data analyses of this study. Finally, a list of the table of contents and references were completed.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Between treatments	B-1	$SS_B = \sum_{j=1}^{B} \frac{(\sum_{j=1}^{n_j} X_{ij})^2}{n_j} - \frac{(\sum_{j=1}^{B} \sum_{i=1}^{n_j} X_{ij})^2}{N}$	$MS = \frac{SS_B}{B-1}$
Within treatments	$\sum_{j=1}^{B} (n_j-1)$	$SS_W = SS_{total} - SS_B$	$MS = \frac{SS_W}{\sum(n_j-1)}$
Total treatments		$SS_{total} = \sum_{j=1}^{B} \sum_{i=1}^{n_j} X_{ij}^2 - \frac{(\sum_{j=1}^{B} \sum_{i=1}^{n_j} X_{ij})^2}{N}$	

Where: B = no. of groups

n_j = no. of observations within group

N = total no. of observations

X_{ij} = the ith observed score in the jth group

Figure 1. Computational procedures for the one-way analysis of variance

CHAPTER IV. ANALYSIS OF DATA AND FINDINGS

The purpose of this chapter is to present an analysis and interpretation of the data. This study focused on Trade and Industrial (T & I) education instructors' extent of use of staff development curriculum, and instructional innovation practices. This information was subjected to statistical procedures and analyses. The findings are presented in this chapter. Specific information is included on the selection of the sample, item frequencies, factor analysis, specific comparisons, t-test, cross tabulation, and an overview.

Research Questions and Hypotheses of the Study

This study examined the following research questions and hypotheses.

Research questions

1. What is the estimate of Trade and Industrial instructors' perceived effectiveness of staff development practices in community and technical colleges?

2. What is the estimate of T & I instructors' perceived effectiveness of innovative instructional practices in the community and technical colleges?

Research hypotheses

1. It is hypothesized that there are no significant differences in the instructors' participation in formal staff development training within the last three years (1981-1983) by:

   a. education, trade cluster, location of present school, and

membership in professional organizations.

b. age, number of years spent in present school district, and number of educational journals read per month.

Statistical hypothesis 1a

H_o: Each of K cell frequencies is independent by marginal frequencies.

H_a: At least one of the cell frequencies differs from the hypothesized frequencies.

Test statistic: $$\chi^2 = \sum_{i=1}^{k} \frac{(n_i - E_i)^2}{E_i}$$

χ^2 = chi-square test of independence

n = observed frequency

E = expected frequency

α = .05.

Statistical hypothesis 1b

H_o: $\mu_f - \mu_w = 0$

H_a: i. $\mu_f - \mu_w \neq 0$

ii. $\mu_f - \mu_w \neq 0$

iii. $\mu_f - \mu_w \neq 0$

(i) instructors with and without formal training

(ii) instructor's years in school district

(iii) number of publications read per month.

Test Statistic: $T = \frac{(\bar{X}_1-\bar{X}_2)-(\mu_1-\mu_2)}{S_p\sqrt{1/n_1+1/n_2}} \sim t_{n_1+n_2-2}$ (Kleinbaum & Kupper, 1978, p. 22).

where: $S_p^2 = \frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{n_1+n_2-2}$

estimates the common variance σ^2 in the two populations. The quantity S_p^2 = pooled sample variance.

2. It is hypothesized that there are no significant relationships between the instructors' degree of perceived extent of use in selected staff development practices and the following independent variables: level of education, level of satisfaction in college teaching, and trade cluster.

Statistical hypothesis 2

(a) H_o: $\mu_l - \mu_b = 0$
H_a: $\mu_l - \mu_b \neq 0$

(b) H_o: $\mu_s - \mu_n = 0$
H_a: $\mu_s - \mu_n \neq 0$

(c) H_o: $\mu_g = \mu_m = \mu_p = \mu_c$
H_a: at least one of the trade cluster means differs from the others.

l = less than college degree
b = college degree(s)
s = satisfied
n = not satisfied
g = graphic communications
m = materials & processes
p = power & energy
c = construction.

Test statistic: $F = \frac{S_B^2}{S_W^2}$; $\alpha = .05$.

3. It is hypothesized that there are no significant relationships between the instructors' use and nonuse of curriculum and instructional innovation practices and the following independent variables: level of education, trade cluster, and level of satisfaction in college teaching.

Statistical hypothesis

(a) H_o: $\mu_1 - \mu_b = 0$

H_a: $\mu_1 - \mu_b \neq 0$

(b) H_o: $\mu_s - \mu_n = 0$

H_a: $\mu_s - \mu_n \neq 0$

(c) H_o: $\mu_g = \mu_m = \mu_p = \mu_c$

H_a: At least one of the trade cluster means differs from others.

Test statistic: $F = \frac{S_B^2}{S_W^2}$; $\alpha = .05$.

Population and Sample

Broadly defined, the target population included trade and industrial education instructors in Iowa, Missouri, and Nebraska currently teaching in the community and technical two-year public colleges at the time this study was conducted.

The sampling procedure developed for this study generated a random sample of 105 trade and industrial education instructors, as illustrated in Table 4.

Table 4. Comparison of sample population by state and trade cluster

Trade cluster	State			Total
	Iowa	Missouri	Nebraska	
Graphic Communications	10	4	8	22
Materials & Processes	16	8	8	32
Power & Energy	21	9	9	39
Construction	8	3	1	12
TOTAL	55	24	16	105

The variation in response rate by state (55 - Iowa, 24 - Missouri, 16 - Nebraska) follows the pattern of number of colleges and area vocational schools in each state included in the study (23 - Iowa, 21 - Missouri, 11 - Nebraska). Table 4 also shows that instructors in the construction trades are represented by the smallest number when compared to other trade clusters. A contributing factor in low response, among other factors explained earlier in Chapter III, stems from the realization that the survey questionnaires were not channeled through the various state directors of public instruction or the academic deans of the various

colleges. These administrators can encourage greater degree of participation.

Item Frequencies

Item frequencies and response rates for each item that was included in the final analysis are listed in Tables 5 and 6. A review of the item responses demonstrates that some items evoked stronger responses than others. By collapsing "not very effective" scores into the "somewhat effective" category, and the "very effective" into the "effective," the items with the most extreme responses were highlighted. The individual items have been organized by the different major and minor dimensions or scales used to develop the instrument.

The major dimensions are:

(a) Staff development practices which include: workshops, seminars, programs; analysis or assessment practices; media, technology, and course development; miscellaneous practices.

(b) Existence of faculty program.

(c) Change or innovation in instructional strategies which includes: instructor directed and student directed strategies.

An analysis of these individual items reveals that several items reflect a strong consensus. Table 4 presents interesting information which has been used to answer the research questions and analyze the research hypotheses of this study. A summary of T & I instructors' background is presented in Table 5. The group mean response of staff development practices and instructional innovation items are presented in

Table 5. Summary of T & I instructors' background

Variable		Frequency		Valid Percent	
Sex: Male		103		98.1	
Female		2	105	1.9	100%
Age: 21-29		6		5.7	
30-39		26		24.8	
40-49		36		34.3	
50-59		26		24.7	
60-69		11	105	10.5	100%
Education:	High school	23		21.9	
	Bachelor's degree	32		30.5	
	Master's degree	18		17.1	
	Doctorate degree	4	105	3.8	100%
Trade cluster:	Graphic Communications	22		21.0	
	Materials & Processes	32		30.5	
	Power & Energy	39		37.1	
	Construction	12	105	11.4	100%
Year in school district:					
1-3 years		15		14.3	
4-9 years		34		32.4	
10-15 years		27		25.7	
more than 15 years		24	105	27.6	100%
Professional organization membership:					
Member		93		88.6	
Nonmember		12	105	11.4	100%
Professional education membership:					
Member - belong to 1		39		37.1	
belong to 2		27		25.7	
belong to 3		19		18.1	
belongs to more than 3 (max 5)		13		12.4	
Nonmember		7	105	6.7	100%
Occupational organization membership:					
Member - belong to 1		36		34.3	
belong to 2		15		14.3	
belong to 3		6		5.7	
belong to more than 3		7		6.7	
Nonmember		41	105	39.0	100%

Table 5. Continued

Number of publications read per month: (education & other career journals)				
0	4		3.8	
1	15		14.3	
2	22		21.0	
3	19		18.1	
more than 3 (max 6)	45	105	42.9	100%
Location of present school:				
urban	29		27.6	
suburban	34		32.4	
rural	42	105	40.0	100%
Attendance in formal staff development training (1981-83)				
attended	97		92.4	
did not attend	8	105	7.6	100%
Satisfaction in college teaching:				
satisfied	73		69.5	
somewhat satisfied	30		28.6	
not satisfied	2	105	1.9	100%

Appendix D.

An examination of Table 5 reveals that more than 50% of the T & I instructors do not have any idea of the effectiveness of staff development practices. This indicates that most development activities do not appear relevant to the felt needs of the instructors. Brimm and Tollett (1974) corroborated this finding in their study of how teachers feel about inservice education. Seventy-three percent of the teachers that they surveyed felt the same lack of relevance in most of the inservice activities which they participated in prior to the survey.

Table 6, item number 10, indicates that 79% of the instructors have no idea of the effectiveness of research activities as providing

Table 6. Item response frequencies (in valid percent) on estimation of effectiveness

Item Number	Staff Development Practices	No Idea of Effectiveness	Somewhat Effective	Effective
	A. Workshops, Seminars, Programs			
S1.	Workshops or presentations that explore various methods or techniques of instruction.	26.7	41.0	32.4
S2.	Workshops, seminars, or short courses that review subject matter or introduce new knowledge in Trade & Industrial field.	22.9	21.0	56.2
S3.	Workshops or seminars dealing with new or different approaches to develop curricula.	38.1	39.0	22.9
S4.	Workshops, seminars, or programs to acquaint staff with goals of the institution and types of students enrolled.	32.4	46.7	21.0
S5.	Workshops, seminars, or programs on testing and evaluation of student performance.	50.5	32.4	17.1
S6.	Workshops or programs in faculty affective development--improving their interpersonal skills or their ability to work effectively in groups, exploring educational values, etc.	50.5	32.4	17.1
S7.	Workshops, seminars, or short courses to improve the management of departmental operations	71.4	21.9	6.7
S8.	Workshops or seminars that explore general issues or trends in occupational education.	52.4	29.5	18.1
S9.	Workshops, seminars, or short courses to help faculty improve their skills in their occupational specialty.	41.0	18.1	41.0
S10.	Workshops or seminars to help faculty improve their academic counseling skills.	62.9	22.9	14.3
S12.	Workshops, seminars, or short courses to help faculty improve their research and scholarship.	79.0	13.3	7.6
	B. Analysis or Assessment Practices			
S13.	Systematic ratings of instruction by students			

	used to help faculty improve.	10.5	46.7	42.9
S14.	Formal assessments by colleagues for teaching or course improvement (i.e., visitations or use of assessment form).	48.6	26.7	24.8
S15.	Informal assessments by colleagues for teaching or course improvement.	50.5	21.0	28.6
S17.	System for faculty to assess their own strengths and areas needing improvement.	51.4	25.7	22.9
S19.	Analysis of in-class video tapes to improve instruction.	72.4	12.4	15.2
S20.	Faculty with expertise consult with other faculty on teaching or course improvement.	50.5	14.3	35.2
S21.	Master teachers or senior faculty work closely with new or apprentice T & I instructors	57.1	9.5	33.3
S22.	Professional and personal development plan, administrator/faculty conference (sometimes called a growth contract) for individual faculty members.	61.0	24.9	14.3
	C. Media, Technology, Course Development			
S23.	Specialist on campus to assist faculty in use of audiovisual aids in instruction.	32.4	16.2	51.4
S24.	Assistance to faculty in use of instructional technology as a teaching aid (e.g., programmed learning or computer-assisted instruction).	54.3	13.3	32.4
S25.	Specialist to assist individual faculty in constructing tests or evaluating student performance.	77.9	10.5	12.4
S26.	Specialists to assist individual faculty in instructional or course development by consulting on course objectives and course design.	61.9	21.0	17.1
S27.	Outside consultants from industry/business to assist faculty with latest technology and practice.	34.3	14.3	51.4
S29.	Special professional library resource easily accessible to T & I faculty dealing with instructional methodology, teaching skills, psychology of learning, industry simulated activities, and similar topics.	50.5	19.0	30.5

Table 6. Continued

	D. Miscellaneous Practices			
S30.	Use of grants by faculty members for developing new or different approaches to courses or teaching.	72.4	14.3	13.3
S31.	Faculty visitations to other institutions (or to other parts of this institution) to update or vitalize T & I programs or innovative projects.	42.9	21.9	35.2
S32.	Faculty take courses offered by colleagues.	41.0	18.1	41.0
S33.	Faculty take courses offered by industry/business.	48.6	12.4	39.0
S34.	Personal counseling provided individual faculty members on career goals and other personal development areas.	81.0	11.4	7.6
S35.	Faculty exchange program with business and industry.	74.3	6.7	19.0
S36.	Faculty take courses at the university or other senior professional institution.	24.8	27.6	47.6
Innovation in Curriculum and Instruction				
	A. Instructor Directed			
M49.	Team Teaching	69.5	13.3	17.1
M50.	Micro Teaching	92.4	1.0	6.7
M55.	Differentiated Staffing	89.5	5.7	4.8
M58.	Peer Instruction	61.0	16.2	22.9
M60.	Simulation or Gaming	79.0	6.7	14.3
M64.	Continuous Progress	60.0	9.5	30.5
M66.	Directed Study	60.0	10.5	29.5
M67.	Competency-Based Instruction	44.8	9.5	45.7
	B. Student Directed			
M51.	Individualized Instruction	31.4	17.1	51.4
M53.	Programmed Instruction	55.2	10.5	34.3
M54.	Computer-Assisted Instruction	81.0*	5.7	13.3
56.	Flexible Scheduling	71.4*	9.5	19.0
M61.	Non-graded Programs	86.6*	5.7	6.7
M63.	Open Entry - Open Exit	79.0*	5.7	15.2
M65.	Independent Study	56.2	17.1	26.7

instructor growth or improvement.

A further examination reveals that 81% of the instructors have not used the "workshop, seminar, or short course to help faculty improve their research and scholarship." The lack of research involvement on the part of T & I instructors continues to reflect the lower academic status other faculty members ascribe occupational education staff.

In general, there is a high percentage rating (70%) in the "no idea of effectiveness" scale. Only item 51 (individual instruction) was rated by 51.4% of the instructors as effective.

Factor Analysis

Individual items were subjected to factor analysis using the principal factoring with iteration method and varimax rotation. These procedures appear to be best suited for identifying any critical factors that might be found in the data. Because of the small number of the sample (105), Gorsuch's (1983) suggestion was that if the "minimum significant correlation coefficient ($p<.05$) with an n of 100 is about 0.2, only elements of S greater than absolute value of 0.4 would be interpreted if the factor analysis was based on 100 individuals" (p. 209). In order to precisely focus the purpose of the study, a reliability analysis was also performed on the specific item sections.

The results of the factoring procedure are presented in Tables 7 and 8. Four factors were finally identified, matching the a priori selected categories of staff development practices. Two factors are identified in the instructional innovation section. One of the factors related to

Table 7. Rotated factor matrix: Staff development practices

Variable	Factor 1	Factor 2	Factor 3	Factor 4
Workshop, Seminars, Programs				
S1	.466	.526	-.173	-.077
S2	.223	.566	.070	.098
S3	.572	.466	.013	.088
S4	.403	.383	.190	.330
S5	.650	.363	-.117	.100
S6	.620	.193	.149	.076
S7	.764	.068	.183	.146
S8	.416	.527	.184	.131
S9	.276	.485	.161	.020
S10	.616	.141	.247	-.050
S12	.628	.083	.189	.079
Analysis or Assessment:				
S13	.074	.354	.074	.178
S14	.115	.483	-.063	.048
S15	.122	.608	.112	.080
S17	.291	.298	.287	.251
S19	.177	.150	.339	.350
S20	.223	.439	.371	.200
S21	.078	.436	.361	.175
S22	.103	.112	.528	.237
Media, Technology, Course Development:				
S23	-.057	.002	.401	.343
S24	.060	.031	.467	.423
S25	.039	.124	-.059	.870
S26	.176	.168	.111	.534
S27	.016	.509	.406	.284
S29	.249	.300	.193	.223
Miscellaneous Practices				
S30	.253	-.051	.584	.044
S31	.216	.275	.643	.058
S32	.330	.174	.151	.125
S33	.192	.423	.485	.020
S34	.375	.172	.232	.257
S35	.188	.236	.387	-.001
S36	.354	.369	.266	-.047

Table 8. Rotated factor matrix: Instructional innovation

Variable	Factor 1	Factor 2
Instructor directed		
M1	.502	.004
M2	.382	.024
M7	.444	-.112
M10	.509	.009
M12	.476	.211
M16	.698	.263
M18	.442	.097
M19	.520	.432
Student directed		
M3	.360	.560
M5	.111	.628
M6	.170	.378
M8	.134	.459
M13	-.008	.363
M15	.024	.451
M17	.278	.509

"instructor-directed" innovation, while the other factor fitted the student-directed innovation category. The following items were dropped from the staff development categories because their factor loading did not present any meaningful interpretation and could not be assigned to any of the four factors extracted: Items S11, S16, S18, and S28 (see Appendix C). Items M4, M9, M11, M14, and M20 were also dropped from the Instructional Innovation Category for similar reasons (see Appendix C).

Factors were formed by including items loading .40 and greater and .30 if they seemed to fit with other items in that factor, provided they loaded greater than .30 in any other factor. For the majority of cases, any item loading below .30 was rejected for inclusion in the analysis. Factor labels for the items with an 'M' designation were selected from common characteristics shared by each item in the group. Item S29 was given special consideration and it was decided to include it in the analysis. Although it had a relatively low loading (.30 and below) on all the four factors it was decided to add it because of the relevance of the item content.

Reliability

Cronbach's coefficient alpha was utilized to derive reliability data on the four factors on staff development practice and two factors on curriculum and instructional innovation scores. Table 11 shows the results of the analysis. Reliability estimates were based on the criteria that alpha figures above .70 indicate high reliability while figures between .50 and .70 indicate moderate reliability, and figures below .50 indicate poor reliability.

Table 9. Factor analysis results: Staff development scales

Variable	Item Statement	Factor Loading
Factor 1. Workshops, Seminars, Programs		
S1.	Workshops or presentations that explore various methods or techniques of instruction.	.47
S2.	Workshops, seminars, or short courses that review subject matter or introduce new knowledge in Trade & Industrial field.	.22
S3.	Workshops or seminars dealing with new or different approaches to develop curricula.	.57
S4.	Workshops, seminars, or programs to acquaint staff with goals of the institution and types of students enrolled.	.40
S5.	Workshops, seminars, or programs on testing and evaluation of student performance.	.65
S6.	Workshops or programs in faculty affective development--improving their interpersonal skills or their ability to work effectively in groups, exploring educational values, etc.	.61
S7.	Workshops, seminars, or short courses to improve the management of departmental operations	.77[a]
S8.	Workshops or seminars that explore general issues or trends in occupational education.	.41
S9.	Workshops, seminars, or short courses to help faculty improve their skills in their occupational specialty.	.27
S10.	Workshops or seminars to help faculty improve their academic counseling skills.	.62
S12.	Workshops, seminars, or short courses to help faculty improve their research and scholarship.	.63
Factor 2. Analysis or Assessment Practices		
S13.	Systematic ratings of instruction by students used to help faculty improve.	.35
S14.	Formal assessments by colleagues for teaching or course improvement (i.e., visitations or use of assessment form).	.48
S15.	Informal assessments by colleagues for teaching or course improvement.	.60[a]
S17.	System for faculty to assess their own strengths and areas needing improvement.	.30

[a]The dominant item in the factor.

Table 9. Continued

S19.	Analysis of in-class video tapes to improve instruction.	.15
S20.	Faculty with expertise consult with other faculty on teaching or course improvement.	.44
S21.	Master teachers or senior faculty work closely with new or apprentice T & I instructors	.44
S22.	Professional and personal development plan, administrator/faculty conference (sometimes called a growth contract) for individual faculty members.	.11
Factor 3. Media, Technology, Course Development		
S23.	Specialist on campus to assist faculty in use of audiovisual aids in instruction.	.34
S24.	Assistance to faculty in use of instructional technology as a teaching aid (e.g., programmed learning or computer-assisted instruction).	.42
S25.	Specialist to assist individual faculty in constructing tests or evaluating student performance.	.87[a]
S26.	Specialists to assist individual faculty in instructional or course development by consulting on course objectives and course design.	.53
S27.	Outside consultants from industry/business to assist faculty with latest technology and practice.	.28
S29.	Special professional library resource easily accessible to T & I faculty dealing with instructional methodology, teaching skills, psychology of learning, industry simulated activities, and similar topics.	.19
Factor 4. Miscellaneous Practices		
S30.	Use of grants by faculty members for developing new or different approaches to courses or teaching.	.58[a]
S31.	Faculty visitations to other institutions (or to other parts of this institution) to update or vitalize T & I programs or innovative projects.	.64
S32.	Faculty take courses offered by colleagues.	.15
S33.	Faculty take courses offered by industry/business.	.48
S34.	Personal counseling provided individual faculty members on career goals and other personal development areas.	.23
S35.	Faculty exchange program with business and industry.	.39
S36.	Faculty take courses at the university or other senior professional institution.	.27

Table 10. Factor analysis results: Instructional innovation

Variable	Item Statement	Loading
Factor 1. Instructor Directed		
M49.	Team Teaching	.50
M50.	Micro Teaching	.38
M55.	Differentiated Staffing	.44
M58.	Peer Instruction	.51
M60.	Simulation or Gaming	.48
M64.	Continuous Progress	.70[a]
M66.	Directed Study	.44
M67.	Competency-Based Instruction	.52
Factor 2. Student Directed		
M51.	Individualized Instruction	.56
M53.	Programmed Instruction	.63[a]
M54.	Computer-Assisted Instruction	.38
M56.	Flexible Scheduling	.46
M61.	Non-graded Programs	.36
M63.	Open Entry - Open Exit	.45
M65.	Independent Study	.51

[a]The dominant item in the factor.

Table 11. Reliability for factor scores

Factor	Number of items	Mean	Standard Deviation	Alpha
Staff Development				
Factor 1 (workshop, etc.)	11	5.93	3.33	0.87
Factor 2 (analysis, etc.)	8	3.24	2.23	0.73
Factor 3 (miscellaneous)	7	3.13	2.00	0.74
Factor 4 (media)	6	2.98	1.88	0.74
Instructional Innovation				
Factor 1 (instructor-directed)	8	2.80	2.17	0.74
Factor 2 (student-directed)	7	3.01	1.94	0.71

An examination of Table 11 reveals that all the factors scores in staff development and in curriculum and instructional innovation demonstrate strong reliability. Factor 1 under staff development indicates a very strong reliability (0.87 coefficient alpha).

Correlation

A nine-variable Pearson correlation matrix was run. Individual factors and independent variables used for further analyses in this study were included in the matrix. Seventeen of the correlations were less than 0.19 and thus not significant. One variable number of professional journals read per month was not significant with any other variable in the matrix.

The variables significant at the 0.05 level and the 0.01 level are identified with an asterisk in Table 12.

Table 12. Correlation matrix of dependent and independent variables

	Workshop	Analysis	Media	Miscel-laneous	Instructor Directed	Student Directed	Age	Years in District	Publi-cations Read
Workshop	1.000	.640*	.420**	.530**	.344**	.443**	.210*	.167	.001
Analysis		1.000	.506**	.645**	.364**	.267**	.111	.154	-.008
Media			1.000	.577**	.221	.415**	.055	.198*	.033
Miscellaneous				1.000	.272**	.320**	.032	.175	.010
Instructor Directed					1.000	.480**	-.045	.164	-.044
Student Directed						1.000	.016	.193*	.016
Age							1.000	.436**	.127
Years in District								1.000	-.039
Publications Read									1.000

*Significant at .05 level.

**Significant at .01 level.

Research Questions

In order to present answers to the research questions included in the study, the original five-point scale on which the data were scored have been collapsed into a three-point scale which included: no idea of effectiveness; somewhat effective; and effective so as to represent a more meaningful analysis. No attempt was made to explain any factors that may have contributed to the respondents specific ratings.

Question 1: What is the estimation of Trade and Industrial (T & I) education instructors' perceived effectiveness of staff development practices in the community and technical colleges?

Table 6 identifies the frequencies of the estimated effectiveness rating by T & I instructors. Basing the answer to research question 1 on Table 6, on the average, 48.9% of the instructors perceived no idea of the effectiveness of staff development workshops, seminars, and inservice programs, while 26.3% felt that the practices are somewhat effective. Only 24.8% of the instructors perceived workshop, seminars, and inservice programs as effective staff development practices.

Based on the findings in Table 6, 50.3% of the instructors do not have any idea of the effectiveness of analysis or assessment category of the staff development practices while 22.6% perceived the practices somewhat effective. More than a quarter of the instructors (27.2%) felt such practices are effective for teachers in community and technical colleges as a result of their having used them.

Slightly more than half of the instructors (51.8%) do not have any idea of the effectiveness of the media, technology, and course development category of the staff development practices while 15.7% confirm that they are somewhat effective. Thirty-two and one-half percent of the T & I instructors actually reported that the practices are effective.

The final category of the staff development practices grouped together under "miscellaneous" are seen by 27.2% of the teachers as effective practice for instructor growth and development in the profession. However, 57.3% of the instructors have no idea of the effectiveness of miscellaneous staff development practices while 15.6% report that the practices are somewhat effective.

A cross-check carried out to match instructors who reported "not used any time" versus "no idea of effectiveness" of staff development practices, produced very interesting and reassuring results in terms of the honesty in responding to the survey questionnaire. Table 13 shows the result of the cross-checking.

The relative difference in the frequency rating presented in Table 13 (A = -1.5%, B = 2.9%, C = -1.5%, D = -2.1%) reveals that less than 3% of the instructors who reported no idea of the effectiveness of any of the categories of staff development practices could have belonged to the group who claim they have used it "less than 5% of the time." The data shown in Table 13 strengthen significantly the validity of the response to the items of the survey by the instructors.

The results in Table 6 confirm the suggestion Nwoke (1980) stated: "teachers recognize the need for continued growth and are anxious

Table 13. Cross-check of staff development data: Not used any time versus no idea of effectiveness

	Not Used Any Time	No Idea of Effectiveness
A. Workshops, Seminars, and Inservice Programs	47.4	48.9
B. Analysis or Assessment Practice	53.2	50.3
C. Media, Technology, Course Development	50.3	51.8
D. Miscellaneous Practices	55.2	57.3

to participate in conferences, seminars, and workshops which offer opportunity to augment as well as strengthen their classroom capabilities and skills" (p. 53), through staff development activities.

Question 2: What is the estimate of T & I instructors' perceived effectiveness of the innovative instructional practices in the community and technical colleges?

Table 14 identifies the frequencies of the estimate of effectiveness score by T & I instructors.

According to Buffer's (1971) proposal, 25% of the teachers in any school who are willing to serve as the early adopters of innovation, was sufficient to implement such changes in a local school. The "critical mass" of 25% is, thus, considered as the minimum level of effectiveness in the inclusion of successful education practices. Using the critical mass as a criterion and combining "somewhat effective" and "effective"

Table 14. Frequencies of effectiveness rating curriculum and instructional innovation (in valid percent)

Item Number	Item Statement	No Idea of Effectiveness	Somewhat Effective	Effective
Instructor Directed				
M1.	Team Teaching	69.5	13.3	17.1
M2.	Micro Teaching	92.4	1.0	6.7
M7.	Differentiated Staffing	81.0	5.7	13.3
M10.	Peer Instruction	71.4	9.5	19.0
M12.	Simulation or Gaming	79.0	6.7	14.3
M16.	Continuous Progress	79.0	9.5	30.5
M18.	Directed Study	60.0	10.5	29.5
M19.	Competency-Based Instruction	44.8	9.5	45.7
Student Directed				
M51.	Individualized Instruction	31.4	17.2	51.4
M53.	Programmed Instruction	69.5	13.4	17.1
M54.	Computer-Assisted Instruction	92.4	1.0	6.7
M56.	Flexible Scheduling	80.0	6.7	13.3
M61.	Non-graded Programs	47.6	15.3	37.1
M63.	Open Entry - Open Exit	98.1	1.0	1.0
M65.	Independent Study	87.6	5.7	6.7

ratings, Table 15, thus reveals innovative practices M1, M12, M3, M5, and M13 as curriculum and instructional innovations that have been adopted by an average of 42.1% (n = 105) of the T & I instructors surveyed.

However, a further analysis of Table 14 shows that in the Instructor Directed Innovation practices slightly over three-fourths (75.3%) of the instructors surveyed have no idea of the effectiveness of the practices, while 7.8% reported some effectiveness. Not surprisingly, less than a quarter (16.8%) of the instructors find instructor directed curriculum and instructional innovations effective for classroom learning delivery system.

Table 14 also shows that 24.6% of the instructors have used and find the instructor directed innovations somewhat effective or effective. This figure is slightly lower than the critical mass criterion of 25%.

The student-directed curriculum and instructional innovations data presented in Table 14 reveal a slightly different result. Instructors who reported that they have no idea of the effectiveness of student directed curriculum and instructional innovation practices included 72.4% of those surveyed. Less than ten percent (8.6%) of the instructors reported some effectiveness while 19% confirmed that the innovative strategies were effective. This distribution illustrates further that 27.6% of the instructors surveyed actually reported some or verifiable effectiveness of student directed educational classroom innovations. This figure is slightly above the "critical mass" criterion of 25% level of acceptance.

Research Hypotheses

The format for reporting the findings of this section of the study includes a restatement of each hypothesis, followed by the display of tables for the statistical test. The findings are then discussed and interpreted.

Research hypothesis 1a

It was hypothesized that there are no significant differences in the instructors' participation in formal staff development training within the last three years (1981-83) by education, trade cluster, location of present school, and membership in professional organizations.

Table 15.1 presents the results of the chi-square test of hypothesis 1, relating to education.

Table 15.1. Instructors' response to formal staff development training by educational level[b]

	Response		
Educational Level	Training	No Training	Row Total
Associate degree and below	47 46.6)	4 (4.4)	51
Bachelors' degree and above	49 (49.4)	5 (4.6)	54
Column Total	96	9	105

[a]χ^2 = 0.6712; df = 1; significance = 0.7956 (Yates correction).

[b]Numbers in parentheses indicate the expected frequencies.

Based on the findings presented in Table 15.1, the result of the chi-square test was not significant at the 0.05 level. The null hypothesis was accepted. The classification of T & I instructors into two broad educational levels (Associate degree and below; Bachelor's degree and above) was a function of the participation in staff development practices.

Table 15.2 presents the results of the test of hypothesis 1 regarding trade clusters of T & I instructors.

Table 15.2. Instructors' response to formal staff development training by trade cluster[b]

	Response		
Trade Cluster	Training	No Training	Row Total
Graphic communication	21 (19.9)	1 (2.1)	22
Materials & Processes	28 (26.2)	1 (2.8)	29
Power & Energy	35 (38.0)	7 (4.0)	42
Construction	11 (10.9)	1 (1.1)	12
Column Total	95	10	105

[a]χ^2 = 4.38164; df = 3; significance = 0.2231 (Yates correction).

[b]Numbers in parentheses indicate the expected frequencies.

Based on the findings presented in Table 15.2, regarding trade clusters the chi-square test of hypothesis 1 was not significant at the 0.05 level. The null hypothesis was accepted. The classification of

the instructors into four clusters shown in Table 15.2 was a function of the participation in staff development practices.

Table 15.3 presents the results of the chi-square hypothesis 1, regarding location of present schools.

Table 15.3. Instructors' response to formal staff development training by location of college[b]

	Response		
College Location	Training	No Training	Row Total
Urban	60 (57.6)	3 (5.4)	63
Nonurban	36 (38.4)	6 (3.6)	42
Column Total	96	9	105

[a]χ^2 = 2.91667; df = 1; significance = 0.0877 (Yates correction).

[b]Numbers in parentheses indicate the expected frequencies.

Based on the data in Table 15.3 regarding location of school, the chi-square test of hypothesis 1 was not significant at the 0.05 level. The null hypothesis was accepted. The classification of the college location of the instructors into urban and nonurban was a function of participation in staff development practices.

Table 15.4 presents the results of the chi-square test of hypothesis 1 regarding membership in professional organizations.

Table 15.4. Instructors' response to formal staff development training by membership in professional organizations[b]

	Response		
College Location	Training	No Training	Row Total
Member	85 (84.1)	10 (10.9)	63
Nonmember	8 (8.9)	2 (1.1)	10
Column Total	93	12	105

[a]χ^2 = 0.37047; df = 1; significance = 0.3704 (Yates correction).

[b]Numbers in parentheses indicate the expected frequencies.

Based on the data in Table 15.4 regarding membership in professional organizations, the chi-square test of the hypothesis was not significant at the 0.05 level. The null hypothesis was accepted. The classification of T & I instructors into professional organizational membership categories (member and nonmember) was a function of the participation in staff development practices.

The reader is cautioned, however, that the chi-square test results, degrees of freedom and significance levels shown under each table (15.1-15.4) were derived from Yates correction. Yates correction normally makes approximations as a result of small cell size in cross tabulation. There were no significant results of the initial chi-square tests for hypothesis 1 hence the decision to adopt "Yates correction" in reporting the chi-square results.

Research hypothesis 1b

It was hypothesized that there are no significant differences in the instructors' participation in formal staff development training within the last three years (1981-1983) by age, number of years spent in present school district, and number of educational journals read per month.

Table 16.1 presents the results of the t-test for hypothesis 1b.

Table 16.1. Pooled variance estimate of the instructors' "extent of use" of staff development practices

Variable	No. of Cases	T-Value	Degrees of Freedom	Two-tail Probability
Age	105	-0.23	103	0.815
Years in school district	105	-1.88	103	0.063
Professional journals read	10	0.39	103	0.696

The two-tailed t-statistic was performed as shown in Table 16.1, with the probability of falsely rejecting the null hypothesis set at 0.05 level of significance. Based on the data reported in Table 16.1, the null hypothesis was accepted. The results indicate no difference in the average participation in formal staff development training as a result of the instructors' age, number of years spent in present school district, and number of educational journals read per month.

Table 16.2 presents the frequency distribution of the instructors' grouped into two categories (those who have undergone formal staff development training and those who have not).

Table 16.2. Instructors' frequency distribution of participation and nonparticipation in formal staff development training

Variable[a]	Number of Cases	Mean	Standard Deviation	Standard Error
Age				
Group 1	95	45.2737	10.292	1.056
Group 2	10	46.1000	13.279	4.199
Years in district				
Group 1	95	10.1368	6.378	0.654
Group 2	10	14.1000	6.027	1.906
Professional organization membership				
Group 1	95	1.4211	1.705	0.175
Group 2	10	1.2000	1.619	0.512

[a]Note: Group 1 = instructors with formal training.

Group 2 = instructors without formal training.

Table 16.2 indicates that instructors who have participated in formal staff development training have a mean age of 45 years while the nonparticipants have a mean age of 46 years. A further analysis reveals that the T & I instructors in this study have an average age of 45.4 years. They have indeed attained middle age and have spent an average of 10-1/2 years in the same school district. A majority of them (90.5%) belong to one professional organization or the other.

Research hypothesis 2

It was hypothesized that there are no significant relationships between the instructors' degree of perceived 'extent of use' in selected categories of staff development practices by level of education, trade cluster, and level of satisfaction in college teaching.

Tables 17.1 to 17.4 present the one-way analyses of variance performed to test hypothesis 2.

Table 17.1. Analyses of variance (one-way) of the "extent of use" of staff development practices

Dependent Variable	Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Workshop/ Seminars	Between groups	3	22.3570	7.4523	.6660	.5749
	Within groups	101	1130.1763	11.1899		
	Total	104	1152.5333			
Analysis/ Assessment	Between groups	3	36.2851	12.0950	2.5356	.0610
	Within groups	101	481.7721	4.7700		
	Total	104	518.0571			
Media	Between groups	3	2.0184	.6728	.1867	.9052
	Within groups	101	363.9435	3.6034		
	Total	104	365.9619			
Miscel- laneous	Between groups	3	4.0057	1.3352	.3272	.8057
	Within groups	101	412.1277	4.0805		
	Total	104	416.1333			

Based on the calculated F values (F-ratio) and their probabilities presented in Table 17.1, hypothesis 2 regarding level of education was

not significant. The null hypothesis was accepted. The reader is cautioned that the instructors' scores could have been affected by the nature of the dependent variables. It is possible that many of the instructors have participated in the various categories of staff development practices. Another limitation is the sequence in educational attainment of the instructors. There is usually no marked skipping of one educational level to another in American educational system.

Table 17.2. Analysis of variance (one-way) of the "extent of use" of staff development practices by trade cluster

Dependent Variable	Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Workshop/ Seminars	Between groups	3	22.4589	7.4863	.6691	.5730
	Within groups	101	1130.0744	11.1889		
	Total	104	1152.5333			
Analysis/ Assessment	Between groups	3	42.8053	14.2684	3.0323	.0328*
	Within groups	101	475.2518	4.7055		
	Total	104	518.0571			
Media	Between groups	3	7.3239	2.4413	.6875	.5671
	Within groups	101	358.6380	3.5509		
	Total	104	365.9619			
Misscel- laneous	Between groups	3	16.9519	5.6506	1.4297	.2385
	Within groups	101	399.1815	3.9523		
	Total	104	416.1333			

*$p < .05$.

Based on the analyses presented in Table 17.2, there is a significant relationship between the extent of use of the "analysis and

assessment" category of staff development practices by the instructors in the various trade clusters. The null hypothesis regarding "analysis and assessment" staff development practices was, therefore, rejected. Results reported in Table 17.2 however indicate no significance at the 0.05 level regarding insufficient evidence to the other listed categories of staff development practices (workshops, seminars, media, etc.; and miscellaneous). The null hypothesis was retained.

By the Scheffé's procedure ranges for the 0.05 level of significance, two of the trade clusters (Graphic Communications and Power and Energy) were found significantly different at the 0.05 level. Data from Scheffé's multiple range test is presented in Figure 2.

Mean	Group	Group 1	Group 2	Group 4	Group 3
2.6364	Group 1				
3.6207	Group 2				
4.0000	Group 4				
4.3333	Group 3	*			

*Denotes pairs of groups significantly different at the 0.05 level.

Group 1 - Graphic Communications

Group 2 - Materials and Processes

Group 3 - Power and Energy

Group 4 - Construction.

Figure 2. Multiple range test of extent of use regarding instructors trade clusters

Table 17.3 presents the analyses of variance performed to test the extent of use of staff development practices by level of instructors' satisfaction in college teaching.

Table 17.3. Analysis of variance (one-way) of the "extent of use" of staff development practices by level of satisfaction

Dependent Variable	Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Workshop/ Seminars	Between groups	1	.2046	.2046	.0183	.8927
	Within groups	103	1152.3288	11.1877		
	Total	104	1152.5333			
Analysis/ Assessment	Between groups	1	.0678	.0678	.0135	.9078
	Within groups	103	517.9893	5.0290		
	Total	104	518.0571			
Media	Between groups	1	.0167	.0167	.0047	.9455
	Within groups	103	365.9452	3.5529		
	Total	104	365.9619			
Miscel- laneous	Between groups	1	.8183	.8183	.2029	.6533
	Within groups	103	415.3151	4.0322		
	Total	104	416.1333			

Based on the analyses in Table 17.3 the result of the analysis was not significant at the 0.05 level. The null hypothesis was accepted. There are no significant mean differences found among T & I trade clusters.

Research hypothesis 3

It is hypothesized that there are no significant relationships between the instructors' use and nonuse of innovative instructional

practices by level of education, trade cluster, and level of satisfaction in college teaching.

Table 18.1 presents the analyses of variance (one-way) to test hypothesis 3, regarding level of education.

Table 18.1. Analyses of variance (one-way) of instructors' LoU of curriculum and instructional innovation practices by educational level

Variable	Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Student-Directed	Between groups	3	4.0361	1.3454	.3512	.7884
	Within groups	101	386.9544	3.8312		
	Total	104	390.9905			
Instructor-Directed	Between groups	3	7.5739	2.5246	.5277	.6643
	Within groups	101	483.2261	4.7844		
	Total	104	490.8000			

Results in Table 18.1 indicate no significance at the 0.05 level. The null hypothesis was retained. There is, therefore, no significant relationship between instructors' use and nonuse of curriculum and instructional innovation practices and their educational level.

Table 18.2 presents the analyses of variance (one-way) to test hypothesis 3, regarding instructors trade clusters.

Results in Table 18.2 indicate no significance at the 0.05 level. The null hypothesis was retained. There is, therefore, no significant relationship between instructors' use and nonuse of curriculum and instructional innovation practices and their trade clusters.

Table 18.2. Analyses of variance (one-way) of instructors' LoU of curriculum and instructional innovation practices by trade cluster

Variable	Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Student-Directed	Between groups	3	8.6681	2.8894	.6053	.6131
	Within groups	101	482.1319	4.7736		
	Total	104	490.8000			
Instructor-Directed	Between groups	1	1.4096	1.4096	.2967	.5872
	Within groups	103	489.3904	4.7514		
	Total	104	490.8000			

Table 18.3 presents the analyses of variance (one-way) to test hypothesis 3 regarding instructors' satisfaction in college teaching.

Results in Table 18.3 indicate no significance at the 0.05 level. The null hypothesis was accepted. There is, therefore, no significant relationship between instructors' use and nonuse of curriculum and instructional innovation in college teaching.

Table 18.3. Analyses of variance (one-way) of instructors' LoU of curriculum and instructional innovation practices by teaching satisfaction

Variable	Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Student-Directed	Between groups	1	.6138	.6138	.1619	.6882
	Within groups	103	390.3767	3.7901		
	Total	104	390.9905			
Instructor-Directed	Between groups	3	3.6483	1.2161	.3171	.8130
	Within groups	101	387.3421	3.8351		
	Total	104	390.9905			

Other Findings

There were other findings as a result of the various statistical analyses of the data collected. Table 19 presents a frequency distribution of the data regarding the existence of faculty development programs and the estimation of their effectiveness.

The researcher decided a priori that scores of 80% or more on the scale "no idea of effectiveness" and 40% or more on the scale "effective" will be included in the analysis. The reader is cautioned that percent reported are "valid percent" results. Results in "existence of program" did not total 100% due to nonresponse of some of the instructors.

Eighty percent or more of the instructors did not perceive items P3 and P8 to be effective, while a comparable percentage (80%) of the instructors reported that such programs did not exist. On the other hand, a little less than 10% of the instructors felt that the two programs (P3 and P8) are effective. These disparities in the knowledge about programs in a college raises certain questions. It is not, however, within the limits of this study to discuss the implications of the results.

Despite the negative report for some other aspects of faculty development programs (P4, P5, P11, and P12), more than 45% of the instructors expressed their perceptions that they felt programs P6 and P10 are effective. The researcher speculates the lack of effective vertical and horizontal communication lines between the administration and T & I

Table 19. Frequency of the existence of faculty development programs and estimation of effectiveness

Item No.	Program
P1	A specific calendar period is set side for professional development
P2	There is periodic review of the performance of all faculty members, whether tenured or not.
P3	Annual merit awards to faculty for excellence in teaching
P4	Temporary teaching load reductions to work on a new course, major course revisions, or research area.
P5	Travel grants to refresh or update knowledge in a particular field.
P6	Travel funds available to attend professional conferences.
P7	Visiting scholar's/industrialist's program that brings people to the campus for short or long periods.
P8	Summer grants for projects to improve instruction/courses.
P9	There is a campus committee on staff or faculty development.
P10	Advisory Committee of business and industry representatives that assist faculty in their professional development.
P11	Circulation of newsletter, articles, etc., that are pertinent to T & I teaching improvement or faculty development.
P12	A policy of faculty improvement leaves that covers professional or technical development.

[a] ≥80% on no idea of effectiveness.

[b] ≥40% on effective rating.

Existence of Program		Estimation of Effectiveness in %		
Does Not Exist	Exists	No Idea of Effectiveness	Somewhat Effective	Effective
40.0	58.1	41.0	42.9	16.2
6.7	92.4	10.5	54.3	35.2
82.9	15.2	80.0[a]	11.4	8.6
75.2	22.9	73.3	10.5	16.2
51.4	45.7	54.3	11.4	34.3
21.9	75.2	26.7	26.7	46.7[b]
71.4	25.7	73.3	11.4	15.2
83.8	13.3	86.7[a]	4.8	8.6
36.2	61.9	45.7	37.1	17.1
27.6	70.5	29.5	22.9	47.6[b]
46.7	51.4	54.3	28.6	17.1
45.7	51.4	50.5	22.9	26.7

instructors in the community and technical colleges surveyed.

Summary of Findings

A survey of community/junior and technical college trade and industrial (T & I) instructors was undertaken in an attempt to produce some insight relating to the stated purpose of the study. A sample of 300 full-time T & I instructors was drawn from rosters provided by the departments of public instruction (post-secondary and vocational division) of Iowa, Missouri, and Nebraska.

The sample was stratified to provide proportional representation from each state but otherwise was randomly drawn from the institutions. A total of 105 instructors provided usable responses to the items in the survey questionnaires mailed to them. The data were coded and analyzed following the procedure stipulated in Chapter 3 (Methodology and Procedure).

Two research questions and three research hypotheses were formulated based on the purpose of the study. The research question and hypotheses were subjected to statistical tests. Results of the analyses are hereby summarized to reflect the research questions and hypotheses of the study already stated in Chapter 2 and restated in Chapter 5 of this study.

Answer to Question 1

Almost one-half (49.5%) of the instructors expressed their perception that they had no idea of the effectiveness of the total staff development practices, based on the data analysis presented in Table 6.

However, a little over a quarter (26.8%) of the instructors perceived the staff development practices effective, while the remaining instructors felt the practices were somewhat effective.

Answer to Question 2

Regarding curriculum and instructional innovation practices only 16.8% of the instructors perceived the practices as effective, based on the data analyses presented in Table 14. Not surprisingly, slightly over three-fourths (75.3%) of the instructors' expressed their perception that they had no idea of the effectiveness of the innovation practices. The remaining instructors perceived the practices as somewhat effective.

Research hypothesis 1

Based on the data analysis presented in Tables 15.1 through 15.4, the chi-square tests of hypothesis 1 was not significant at the 0.05 level. The null hypothesis was, therefore, retained. The instructors' classification by educational attainment, trade cluster, location of college and membership in professional organizations was a function of their participation in formal staff development training.

Research hypothesis 2

Based on the data analysis presented in Table 17.2 there is a significant relationship between the extent of use of the analysis and assessment categories of formal staff development practices by instructors in the different trade clusters.

A further analysis based on Figure 2, indicates that instructors in the power and energy cluster used the assessment and analysis aspects of staff development practices more than 50% of the time during their classroom teaching. Those in the Graphic Communications cluster were found to use the same practices 5% to 20% of the time.

The data presented in Table 17.2 indicate no significant relationship in the extent of use of other staff development practices (workshops, seminars; media, etc.; and miscellaneous) by the instructors in the various trade clusters (graphic communications; materials and processes; power and energy; construction).

Research hypothesis 3

Based on the data analyses presented in tables 18.1 through 18.3, there are no significant differences between the instructors' level of use of innovative instructional practices by educational attainment, trade cluster, and satisfaction in college teaching. The null hypothesis was, therefore, retained. The reader is, however, cautioned that only 16.8% of the instructors perceived the practices as effective while 72% expressed their perception that they had no idea of the effectiveness of the practices.

CHAPTER V. CONCLUSIONS, OVERVIEW, AND RECOMMENDATIONS

Chapters I through IV of this study dealt with the introduction, review of pertinent literature, methodology and procedures, and analysis and findings of this research. This chapter restates the problem, purpose, research questions and hypotheses of the study. A brief discussion and conclusions based upon the findings follow each research question and hypothesis. The researcher's overview, along with recommendations that stem from this research study are presented in this chapter.

Restatement of the problem

The problem of this study was to investigate the nature and extent of participation and adoption of staff development practices by Trade and Industrial (T & I) education instructors in the community and technical colleges in Iowa, Missouri, and Nebraska.

Restatement of the purpose

The purpose of this study was to determine:

1. instructors' extent of use of four categories of staff development practices (workshops, seminars; analysis and assessment; media etc., and miscellaneous practices).
2. The level of implementation/adoption of curriculum and instructional innovation practices learned during formal staff development training.

Research question 1

What is the estimation of Trade and Industrial education instructors' perceived effectiveness of staff development practices in the community and technical colleges?

Discussion and conclusion

A frequency analysis was performed to answer research question 1. Based on the findings presented in Table 6, it was concluded that, on the average, a larger proportion (32.5%) of the instructors perceived media, technology, and course development practices more effective, followed by miscellaneous practices, analysis and assessment, and lastly workshop, seminars, and program development.

Research question 2

What is the estimate of T & I instructors' perceived effectiveness of the innovative curriculum and instructional practices in the community and technical colleges?

Discussion and conclusion

A frequency analysis was also performed to answer research question 2. Based on the findings presented in Table 14, it was concluded that on the average, 21% of the instructors perceived the innovation strategies effective while 72.3% expressed their perception that they had no idea of the effectiveness of these practices. A rather small number (6.7%) of the instructors reported perceiving the innovative strategies somewhat effective.

Research hypothesis 1

Hypothesis 1 predicted that there would be no significant mean differences in the instructors' participation in formal staff development training within the last three years (1981-1983) by age, number of years spent in the present school district, number of professional education journals read per month, level of education, trade cluster, location of present school, and membership in professional organization.

Discussion and conclusion

A series of chi-square tests were performed in an attempt to test the null hypothesis. based on the findings presented in Tables 15.1 through 15.4, it was concluded that no two groups of subjects in this study were significantly different from each other. The demographic characteristics of the instructors that were listed were not a function of their participation in formal staff development training.

Research hypothesis 2

Hypothesis 2 predicted that there would be no significant mean relationships between the instructors' perceived "extent of use" in the categories of staff development practices by level of education, trade cluster, and level of satisfaction in college teaching.

Discussion and conclusion

Single-classification analyses of variance were performed to test the null hypothesis. Based on the findings presented in Tables 17.1 through 17.4, the following conclusions were drawn:

(a) That there was a significant relationship among the group of instructors (trade clusters) regarding the extent of use of analysis and assessment staff development practices.

(b) That the Graphic Communications group was different from the Power and Energy group.

(c) That the Power and Energy group of instructors used analyses and assessment category of staff development more than 20% of the time while the Graphic Communications group used it more than 5% but less than 20% of the time.

(d) That no other groups were different in the extent of use of staff development practices.

Research hypothesis 3

Hypothesis 3 predicted that there would be no significant relationships between the instructors' level of use of innovative instructional practices by level of education, trade cluster, and level of satisfaction in college teaching.

Discussion and conclusions

A series of single-classification analysis of variance with significance set at the .05 level were performed to test the null hypothesis. Based on the findings presented in Tables 18.1 through 18.3 it was concluded that no significant relationship existed between the instructors level of use of innovative practices in curriculum and instruction and the stated demographic characteristics.

It is, however, necessary to reemphasize that the findings and conclusions do not make broad generalizations tenable in the entire Midwest states.

Overview

This section of Chapter V provides the researcher's viewpoint in addition to the review of literature, findings, and conclusion based on the interpretation of the statistical analysis.

There is ample evidence of some ambiguity regarding what really constitutes staff development practices. As a profession, there is a need for teachers to provide a more crystallized definition of staff development and then to identify through research those practices that do improve instruction and contribute to personal and professional growth.

It seems reasonable to assume that, for most innovations "extended training spread over time is a prerequisite for change and that on-site cultural adaptation assistance is required to solve the specific problems that occur during implementation" (Parish & Arends, 1983, p. 65). Current literature does reemphasize the already known fact that school administrators control access and adoptions while teachers control implementation. Therefore, school administrators, teachers, teacher educators, and outside curriculum and instruction developers should now, more than ever before, strive for a stronger collaborative input and involvement prior to any local or regional staff development training.

To recapitulate the findings on the level of education of T & I instructors, 21.9% had high school diplomas, 26.7% had associate degrees,

30.5% had bachelors degrees, 17.1% had masters degrees while 4% had a doctorate degree. The ratio of baccalaureate or higher degree to nondegree holders is 1.06:1.00 which indicates a narrowing of the gap between them. However, slightly more than one-fifth (21.9%) of the instructors still hold only a high school diploma. More incentives should be provided for this group to further their education. 'Hi-tech' is based upon quality education.

It is encouraging to discover that 51.4% of the Trade and Industrial education teachers in community/junior and technical colleges currently had a baccalaureate or higher degree. This achievement indicates that more trade and industrial education teachers have the benefit of better preservice teacher preparation. Nevertheless, because of the rapidly changing technologies, more diversified student populations to be served, and changing emphasis in employment requirements of trade and industrial graduates, trade and industrial education teachers are continuously confronted with the needs to stay current in their area of specialization as well as in their professional competencies.

The research findings clearly indicate that the challenge for satisfying the inservice needs of trade and industrial education instructors and enabling them to implement innovative practices continues to be unmet for the majority. This research collaborates with the findings of the comprehensive review of previous studies by Lawrence et al. (1974). They noted that it was clear that staff development programs under certain conditions were effective. From an analysis of 97 studies, Lawrence and

his colleagues found, among other things, that inservice education programs that have differentiated training experiences for different teachers are more likely to accomplish their objectives than are programs that have common activities for all participants.

Recommendations for Further Research

The following recommendations are based upon the results of this study:

1. Given adequate funding, similar research should be conducted within the next five years to assess the extent of participation and the satisfaction with the quality of educational experiences received in T & I staff development activities. The study should also determine if improvements are being made in staff development activities regarding the design, use, effectiveness, and assessment. The sample for the study should include T & I instructors in all the Midwest states. The researcher(s) should solicit the approval of the various state directors of public post-secondary State Board of Instruction to ensure higher return rates (60% or more) of the survey questionnaires.
2. Some long-term assessment should be made of those instructors who do adopt curriculum and instructional innovation in community/junior and technical colleges to identify variables which contribute to adoption practices.
3. Finally, the role of administrators in community/junior and technical colleges should be included in future research on staff/faculty development in post-secondary noncollegiate schools.

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APPENDIX A. COVER LETTER

IOWA STATE
UNIVERSITY

College of Education
Industrial Education and Technology
Ames, Iowa 50011
Telephone: 515-294-1033

November 29, 1983

Dear Fellow Educator,

You are a recognized leader in Trade and Industrial (T & I) Education programs in your community. We feel that your response to this questionnaire will provide meaningful and necessary information for our research.

We have enclosed a survey questionnaire of T & I Education Staff Development Practices in Iowa, Nebraska and Missouri. The purpose of the survey is to assess perceptions of T & I instructors in an attempt to learn the *effectiveness levels* which they attached to the practices and instructional innovations which they have adapted in their classrooms and laboratories.

The study is a partial fulfillment of the Ph.D degree requirement at Iowa State University, Ames. The confidentiality of your response is guaranteed.

Would you please take 20 - 30 minutes and complete the questionnaire. Please return the completed questionnaire within the next two weeks, in the addressed and stamped envelop enclosed.

Thank you in advance for your participation and assistance in this research. Let us know if you'll be interested in the findings by indicating your name and address on the bottom of this page.

Yours Sincerely,

William D. Wolansky Ph.D.
Major Professor &
Coordinator, International Education Programs

Ben U. Nwoke
Graduate Teaching Assistant

Name:_____

Address:_____

_____

_____

APPENDIX B. SURVEY INSTRUMENT

TRADE AND INDUSTRIAL EDUCATION STAFF DEVELOPMENT PRACTICES

IN THE COMMUNITY AND TECHNICAL COLLEGES IN THE MIDWEST

Staff Development Practice Questionnaire

Directions: Do not put your name on the questionnaire. When no response seems exactly appropriate, try to select an answer as close as possible to your situation or perception. Please return the questionnaire in the self-addressed and stamped envelop provided. Check (✓) your response.

I. Demographic Information

1. Your Sex: Male ____. Female ____.
2. Your Age (in years)____.
3. Highest level of education: A.A Degree ___, B.S ___, M.S ___, Ph.D ___, Other(specify) _____.
4. Your major occupational teaching area: _____;
5. Number of years spent in present school district: ___.
6. Membership in professional organizations. How many in:
   a. Professional Education? ___. b. Other occupational Organization? ___.
7. Number of educational or other career publications read on a monthly basis? _____.
8. Location of your present school: Urban ___. Sub-urban ___. Rural Setting ___.
9. Have you received any formal staff development training (workshops, seminars, institutes, etc) within the last 3 years? No ___. Yes ___. If Yes, approximately ___ days.
10. Are you satisfied with college teaching as a career? No ___. Somewhat ___. Yes ___.

II. Staff Development Practices

Listed below are a number of practices that might be used to help faculty develop in their variety of roles as instructors. Of the following practices *which you have used*, please indicate how effective you feel they have been as development practices. (Circle appropriate responses).

RESPONSE KEY

Extent of Use

0 Not used any time
1 Used less than 5% of the time
2 Used 5% - 20% of the time
3 Used 20% - 50% of the time
4 Used over 50% of the time

Estimation of Effectiveness

0 No idea of effectiveness
1 Not very effective
2 Somewhat effective
3 Effective (or worthwhile)
4 Very effective

Item No.	Extent of Use.					PRACTICE (Respond only if Used)	Estimation of Effectiveness				
	Not Used any time	Used less than 5% of the time	Used 5% - 20% of the time	Used 20% - 50% of the time	Used over 50 % of the time		No idea of effectiveness	Not very effective	Somewhat effective	Effective (or worthwhile)	Very effective
	0	1	2	3	4		0	1	2	3	4
						A. Workshops, Seminars, Programs					
S1.	0	1	2	3	4	Workshops or presentations that explore various methods or techniques of instruction.	0	1	2	3	4
S2.	0	1	2	3	4	Workshops, seminars, or short courses that review subject matter or introduce new knowledge in Trade & Industrial field.	0	1	2	3	4
S3.	0	1	2	3	4	Workshops or seminars dealing with new or different approaches to develop curricula.	0	1	2	3	4
S4.	0	1	2	3	4	Workshops, seminars, or programs to acquaint staff with goals of the institution and types of students enrolled.	0	1	2	3	4

Extent of Use						PRACTICE	Estimation of Effectiveness				
Not used any time	Used less than 5% of the time	Used 5% - 20% of the time	Used 20% - 50% of the time	Used over 50% of the time			No idea of effectiveness	Not very effective	Somewhat effective	Effective (or worthwhile)	Very effective
0	1	2	3	4		(Respond only if Used)	0	1	2	3	4
						Workshops, Seminars, Programs (Continued)					
S5. 0	1	2	3	4		Workshops, seminars or programs on testing and evaluation of student performance.	0	1	2	3	4
S6. 0	1	2	3	4		Workshops or programs in faculty *affective* development—improving their interpersonal skills or their ability to work effectively in groups, exploring educational values, etc.	0	1	2	3	4
S7. 0	1	2	3	4		Workshops, seminars or short courses to improve the management of departmental operations.	0	1	2	3	4
S8. 0	1	2	3	4		Workshops or seminars that explore general issues or trends in occupational education.	0	1	2	3	4
S9. 0	1	2	3	4		Workshops, seminars or short courses to help faculty improve their skills in their occupational specialty.	0	1	2	3	4
S10. 0	1	2	3	4		Workshops or seminars to help faculty improve their academic counseling skills.	0	1	2	3	4
S11. 0	1	2	3	4		Workshops or seminars in co-operative education.	0	1	2	3	4
S12. 0	1	2	3	4		Workshops, seminars or short courses to help faculty improve their research and scholarship.	0	1	2	3	4
						B. Analysis or Assessment Practices					
S13. 0	1	2	3	4		Systematic ratings of instruction by students used to help faculty improve.	0	1	2	3	4
S14. 0	1	2	3	4		Formal assessments by colleagues for teaching or course improvement (i.e., visitations or use of assessment form).	0	1	2	3	4
S15. 0	1	2	3	4		Informal assessments by colleagues for teaching or course improvement.	0	1	2	3	4
S16. 0	1	2	3	4		Systematic teaching or course evaluation by an administrator for improvement purposes.	0	1	2	3	4
S17. 0	1	2	3	4		System for faculty to assess their own strengths and areas needing improvement.	0	1	2	3	4
S18. 0	1	2	3	4		Classroom visitation by an instructional resource person (i.e., curriculum development specialist), upon request followed by a diagnosis of teaching.	0	1	2	3	4
S19. 0	1	2	3	4		Analysis of in-class video tapes to improve instruction.	0	1	2	3	4
S20. 0	1	2	3	4		Faculty with expertise consult with other faculty on teaching or course improvement.	0	1	2	3	4
S21. 0	1	2	3	4		*Master teachers* or senior faculty work closely with new or apprentice T & I instructors.	0	1	2	3	4
S22. 0	1	2	3	4		Professional and personal development plan, administrator/faculty conference (sometimes called a growth contract) for individual faculty members.	0	1	2	3	4
						C. Media, Technology, Course Development					
S23. 0	1	2	3	4		Specialist on campus to assist faculty in use of audiovisual aids in instruction.	0	1	2	3	4
S24. 0	1	2	3	4		Assistance to faculty in use of instructional technology as a teaching aid (e.g., programmed learning or computer-assisted instruction).	0	1	2	3	4
S25. 0	1	2	3	4		Specialist to assist individual faculty in constructing tests or evaluating student performance.	0	1	2	3	4
S26 0	1	2	3	4		Specialists to assist individual faculty in instructional or course development by consulting on course objectives and course design.	0	1	2	3	4
S27. 0	1	2	3	4		Outside consultants from industry/business to assist faculty with latest technology and practice.	0	1	2	3	4
S28. 0	1	2	3	4		Specialist to help faculty develop teaching skills such as lecturing or leading discussions, or to encourage use of different teaching-learning strategies such as oral questioning, individualized instruction etc.	0	1	2	3	4

Extent of Use					PRACTICE	Estimation of Effectiveness				
Not used any time	Used less than 5% of the time	Used 5% - 20% of the time	Used 20% - 50% of the time	Used over 50% of the time	(Respond only if used)	No idea of effectiveness	Not very effective	Somewhat effective	Effective (or worthwhile)	Very effective
0	1	2	3	4		0	1	2	3	4
					Media, Technology, Course Development (Continued)					
S29. 0	1	2	3	4	Special professional library resourse easily accessible to T & I faculty dealing with instructional methodology, teaching skills, psychology of learning, industry simulated activities, and similar topics.	0	1	2	3	4
					D. Miscellaneous Practices					
S30. 0	1	2	3	4	Use of grants by faculty members for developing new or different approaches to courses or teaching.	0	1	2	3	4
S31. 0	1	2	3	4	Faculty visitations to other institutions (or to other parts of this institution) to update or vitalize T & I programs or innovative projects.	0	1	2	3	4
S32. 0	1	2	3	4	Faculty take courses offered by colleagues.	0	1	2	3	4
S33. 0	1	2	3	4	Faculty take courses offered by industry/business.	0	1	2	3	4
S34. 0	1	2	3	4	Personal counseling provided individual faculty members on career goals and other personal development areas.	0	1	2	3	4
S35. 0	1	2	3	4	Faculty exchange program with business and industry.	0	1	2	3	4
S36. 0	1	2	3	4	Faculty take courses at the university or other senior professional institution.	0	1	2	3	4

III. Existence of Faculty Development Program

Please indicate whether your institution has each of the following practices.

If Yes (i.e. *Practice Exists*), estimate its effectiveness on the scale of 0 to 4 provided.

PRACTICE									
Does Not Exist	Exists	PRACTICE							
P1. 1	2	A specific calendar period is set aside for professional development.	0	1	2	3	4		
P2. 1	2	There is periodic review of the performance of all faculty members, whether tenured or not.	0	1	2	3	4		
P3. 1	2	Annual merit awards to faculty for excellence in teaching	0	1	2	3	4		
P4. 1	2	Temporary teaching load reductions to work on a new course, major course revisions, or research area.	0	1	2	3	4		
P5. 1	2	Travel grants to refresh or update knowledge in a particular field.	0	1	2	3	4		
P6. 1	2	Travel funds available to attend professional conferences.	0	1	2	3	4		
P7. 1	2	*Visiting scholar's/industrialist's* program that brings people to the campus for short or long periods.	0	1	2	3	4		
P8. 1	2	Summer grants for projects to improve instruction/courses.	0	1	2	3	4		
P9. 1	2	There is a campus committee on staff or faculty development.	0	1	2	3	4		
P10. 1	2	Advisory Committee of business and industry representatives that assist faculty in their professional development.	0	1	2	3	4		
P11. 1	2	Circulation of newsletter, articles, etc., that are pertinent to T & I teaching improvement or faculty development.	0	1	2	3	4		
P12. 1	2	A policy of faculty improvement leaves that covers professional or technical development.	0	1	2	3	4		

IV. Change and Innovation in Curriculum and Instruction

On the next page are representative innovations in programs and methods of instruction designed to increase efficiencey in classroom instruction. Please indicate the *level* you have utilized or adapted the innovation. Consider all of the tasks involved.

RESPONSE KEY

Levels of Use of the Innovation

0 Non-Use:..... The user has little or no knowledge of the innovation.

1 Orientation:... The user has acquired or is acquiring information about the innovation.

2 Preparation:... The user is preparing for first use of the innovation.

3 Mechanical Use: The user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection.

4 Routine:..... Use of the innovation is stabilized. User varies the use of the innovation to increase the impact on students.

5 Integration:.. The user combines own efforts to use the innovation, with related activities of colleagues.

6 Renewal:..... The user evaluated the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on students.

	Levels of Use							Instructional Methodology	Estimation of Effectiveness				
	Non-Use	Orientation	Preparation	Mechanical Use	Routine	Integration	Renewal		No Idea of Effectiveness	Not Very Effective	Somewhat Effective	Effective	Very Effective
	0	1	2	3	4	5	6	(Respond only if Used)	0	1	2	3	4
M1.	0	1	2	3	4	5	6	Team Teaching	0	1	2	3	4
M2.	0	1	2	3	4	5	6	Micro Teaching	0	1	2	3	4
M3.	0	1	2	3	4	5	6	Individualized Instruction	0	1	2	3	4
M4.	0	1	2	3	4	5	6	Educational Television	0	1	2	3	4
M5.	0	1	2	3	4	5	6	Programmed Instruction	0	1	2	3	4
M6.	0	1	2	3	4	5	6	Computer-Assisted Instruction	0	1	2	3	4
M7.	0	1	2	3	4	5	6	Differentiated Staffing	0	1	2	3	4
M8.	0	1	2	3	4	5	6	Flexible Scheduling	0	1	2	3	4
M9.	0	1	2	3	4	5	6	Instructional Resource Center	0	1	2	3	4
M10.	0	1	2	3	4	5	6	Peer Instruction	0	1	2	3	4
M11.	0	1	2	3	4	5	6	Remote Teaching by Telephone	0	1	2	3	4
M12.	0	1	2	3	4	5	6	Simulation or Gaming	0	1	2	3	4
M13.	0	1	2	3	4	5	6	Non-graded Programs	0	1	2	3	4
M14.	0	1	2	3	4	5	6	Pass-Fail	0	1	2	3	4
M15.	0	1	2	3	4	5	6	Open Entry - Open Exit	0	1	2	3	4
M16.	0	1	2	3	4	5	6	Continuous Progress	0	1	2	3	4
M17.	0	1	2	3	4	5	6	Independent Study	0	1	2	3	4
M18.	0	1	2	3	4	5	6	Directed Study	0	1	2	3	4
M19.	0	1	2	3	4	5	6	Competency-Based Instruction	0	1	2	3	4
M20.	0	1	2	3	4	5	6	Use of Teacher Aide	0	1	2	3	4

V. Comments/Contributions

If you have any comments or contributions regarding T & I staff development practices in community and technical colleges, please feel free to make your comments/contributions below. Thank you.

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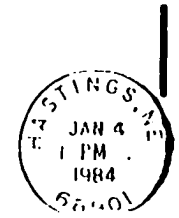

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APPENDIX C. FOLLOW-UP POSTCARD

Iowa State University
Ames, Iowa 50011
January 20, 1984

Dear T & I Educator,

We would like to include your responses in our study of T & I Education Staff Development Practices in the Community/ Junior and Technical Colleges in the Midwest. If you have mailed your questionnaire recently, we want to express our thanks to you.

If you have not mailed your questionnaire, please complete and return it in the special envelope enclosed with the questionnaire.

Sincerely,

William D. Wolansky
Professor & Coordinator
International Educ Programs

Ben U. Nwoke
Graduate Teaching Assistant
Industrial Educ & Technology